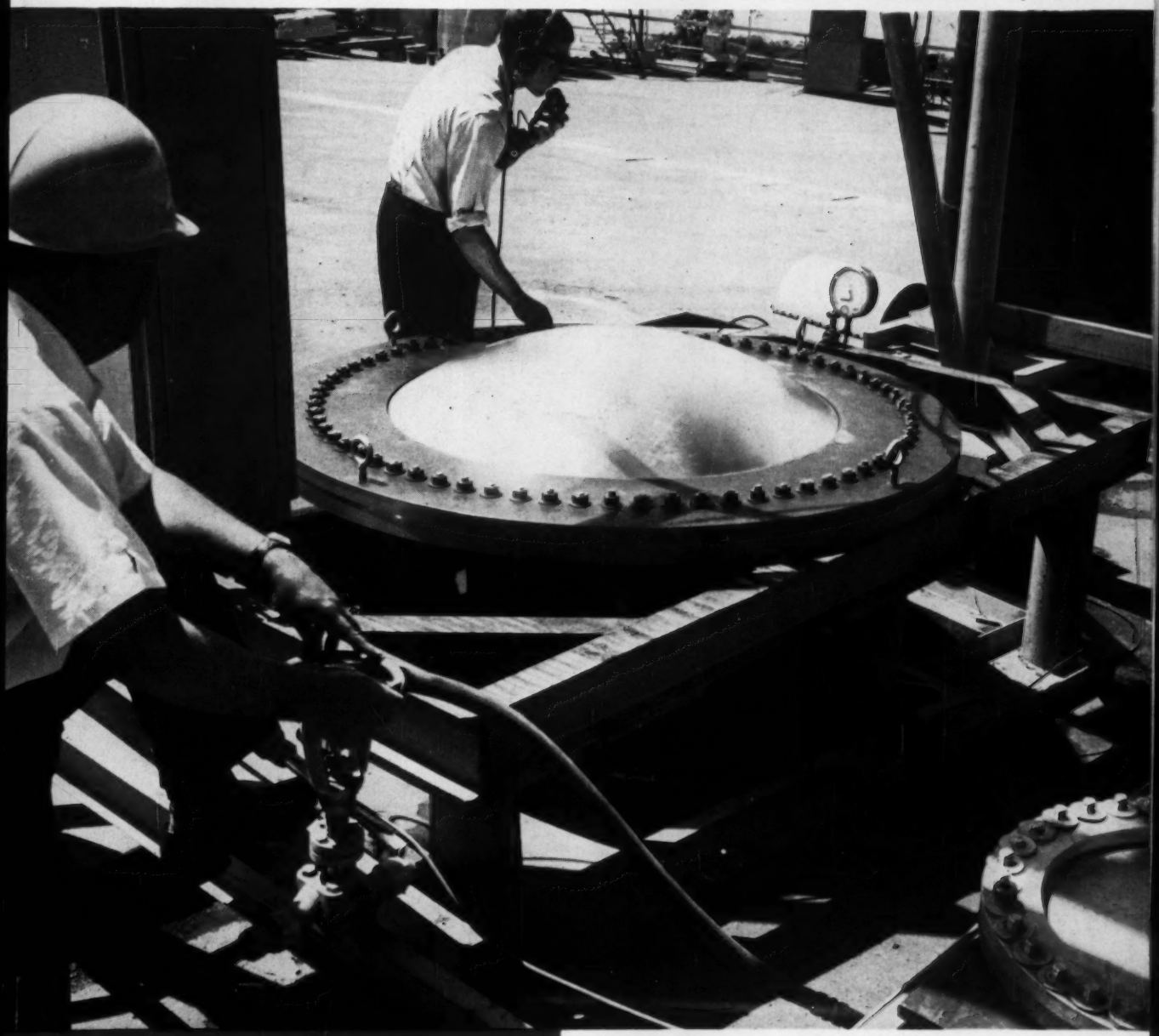
IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication DECEMBER 28, 1961



★ Test Engineers at General Dynamics Show—

How Fluid Pressure Shapes Bulkheads for Space p. 43

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A New Look in the NLRB p. 21

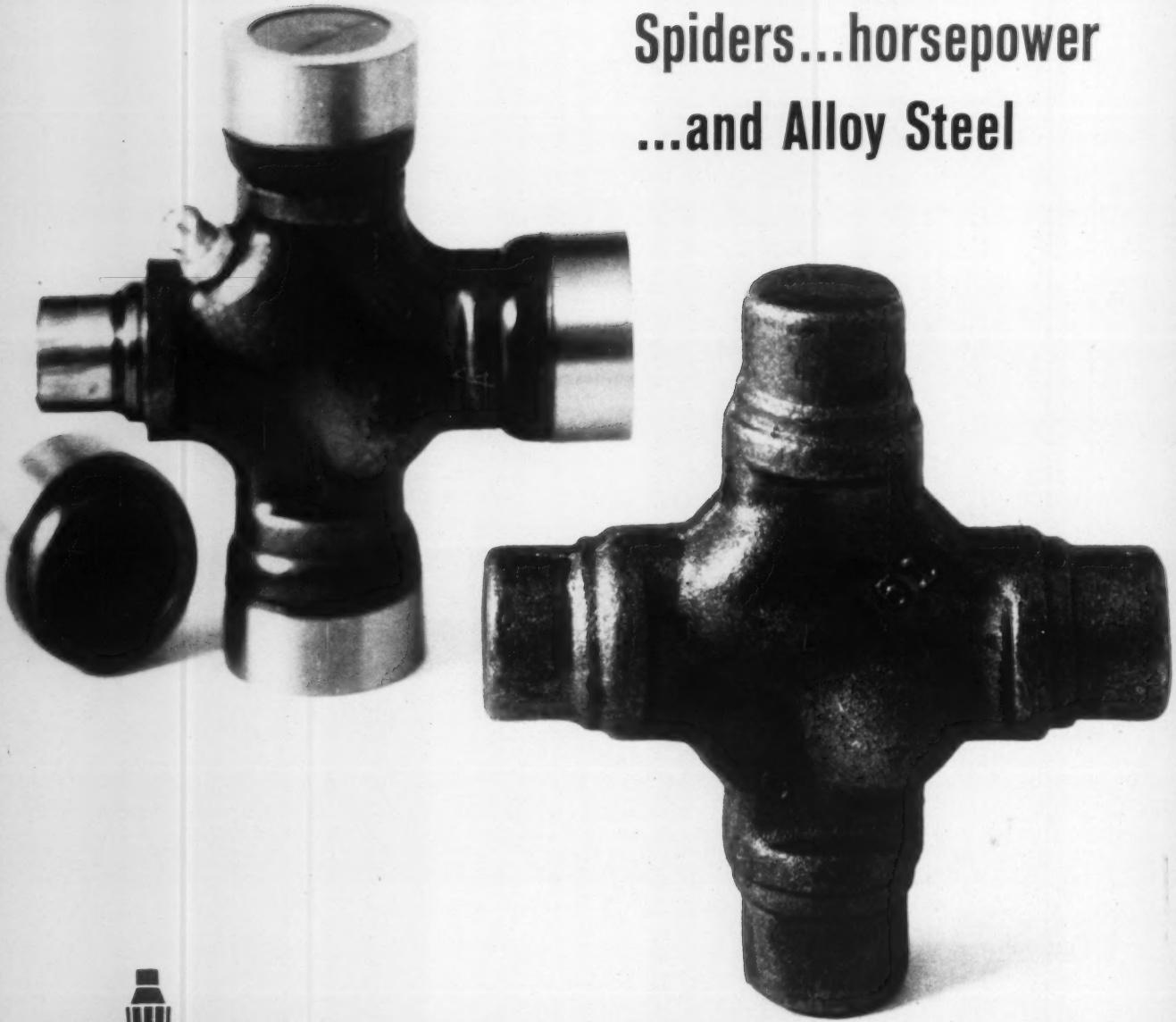
Digest of the Week p. 2-3

Why are these spiders, or universal joint crosses for automotive replacement, forged from alloy steel? NEAPCO engineers said the reason was today's "souped up" engines. Higher horsepower ratings mean higher torque requirements. And the torque requirements imposed on many automotive parts demand an alloy grade.

NEAPCO, like many other producers for the automotive after-market, follows OEM specs . . . for this part uses Aristoloy 5120 . . . one of the many electric furnace grade alloys available from Copperweld.

To obtain complete information about Aristoloy alloy steels in leaded and unleaded grades, call your nearest Copperweld representative. Or write for Products and Facilities Catalog today.

Spiders...horsepower ...and Alloy Steel



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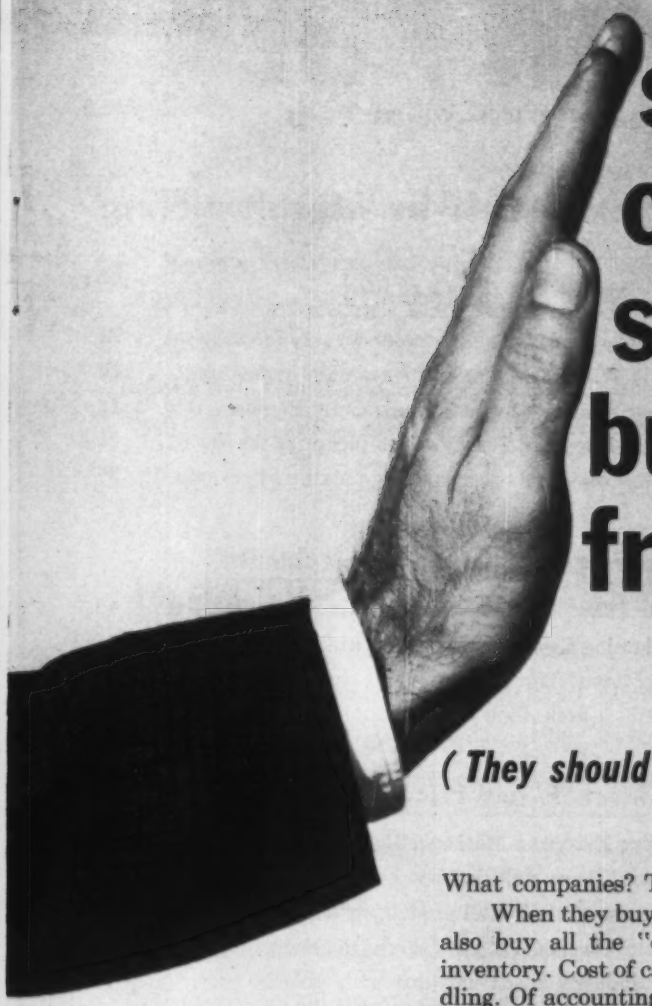

some companies shouldn't buy steel from us

(They should buy from a steel service center.)

What companies? Those who use steel in small or moderate lots.

When they buy steel from a mill and keep it in inventory, they also buy all the "costs of possession" that go along with that inventory. Cost of capital. Of storage space . . . insurance . . . handling. Of accounting . . . scrap . . . taxes . . . obsolescence.

But when they use the large stocks of their service center as their own, they reduce or eliminate those "costs of possession." And those savings can more than offset the few cents more they pay for service-center steel.

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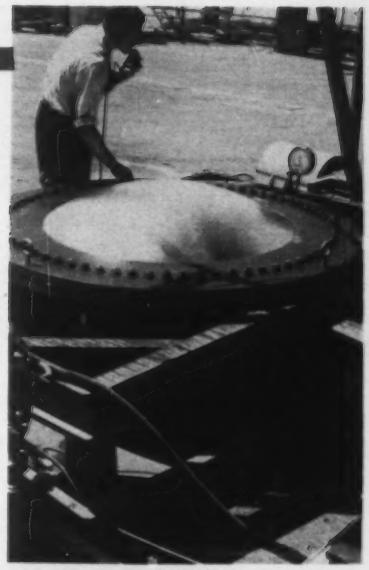


Water "Blows" Bulkheads for Space

Various fluids can be used in a new process to shape huge parts. With low-cost tooling, any temperature from —400° to 2700°F may be maintained throughout each forming cycle. Cover photo shows how General Dynamics/Astronautics uses water pressure at 350 psi to bulge space-vehicle bulkheads into shape. p. 43

NLRB Speeds Up and Tightens Up

The National Labor Relations Board has stepped up its campaign against unfair labor practices. Under Chairman F. W. McCulloch, right, the NLRB is cutting its backlog and with full intent of "taking the profit out of unfair labor practices." p. 21

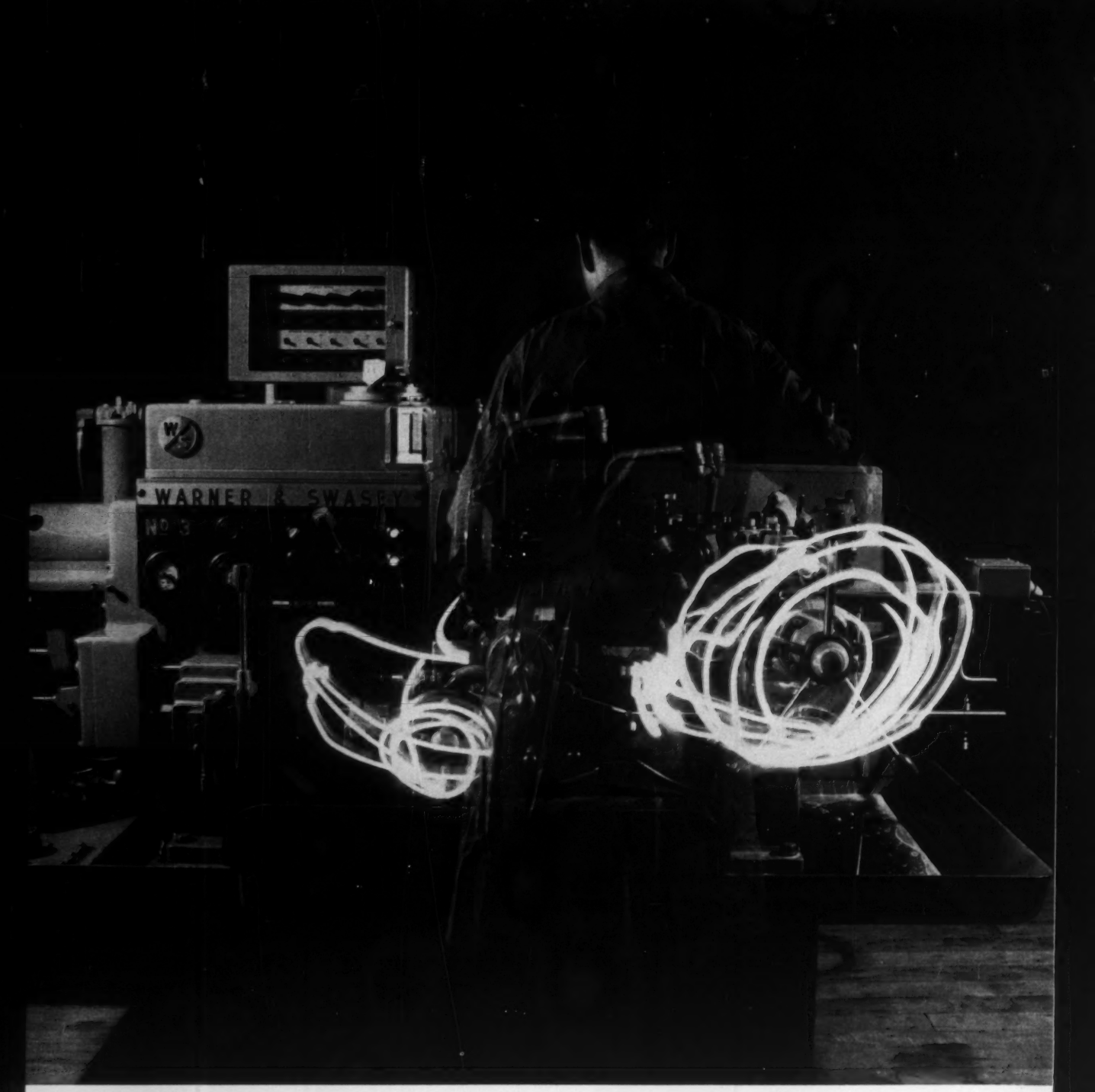
Steelmakers Lead Spending Upturn

Capital goods orders by metalworking companies will see a further pickup early next year. For the first time since early '59, the industry's third-quarter capital appropriations gained significantly. The steel industry is contributing the most strength to the rising trend. p. 28

Next Week

Annual Business Forecast Issue

Next week executives in some 20 metalworking industries forecast the sales, profit and cost outlook for 1962. Other annual features include a six-month forecast for steel consumption and a detailed report on the growth of West Europe markets.



Hands off the headstock! Electro-Cycle automates spindle start, stop, reverse and speed changes throughout the entire machining cycle. With headstock handling eliminated, the operator develops a highly efficient rhythm for fast-cycle production. Turret lathes with exclusive Electro-Cycle control are built by The **Warner & Swasey** Company, Cleveland.

Death at the U.N.: Caused by a "Neutral"

The great preacher exhorted his people against war and aggression. He exorcised those he believed guilty of such transgressions. After these tirades he descended from the pulpit; then committed what he preached against.

So stands Prime Minister Nehru of India. To hold any other viewpoint is to be blind to the facts. The champion of passiveness has become the symbol of aggressiveness in Asia. He will be the one responsible for all future "necessary" wars in Asia, should they come.

But Mr. Nehru has done more than shock all people—except the Communists who applaud his action. He has started the United Nations on its way to annihilation. This at a time when it was engaged in a questionable action in the Congo. This at a time when there have been signs of weakness in the whole fabric of the U. N.

The words used by Mr. Nehru in his aggressive war to "liberate" the Goanese were an insult to all who have befriended and supported the Indian leader. Goa couldn't have been a "threat" to India.

For Nehru or his supporters to defend his action by downgrading others or calling it a liberating gesture is an impertinence that cannot be brushed off.

That arch anti-American, Krishna Menon, who —as India's Foreign Minister—fostered and directed the war against Goa, must be happy in his dual personality. Time and time again he has attacked the United States in most outlandish language. He has championed the "weak," the "neutrals," and has accused the West of colonial designs. Now, he must argue his way out of a new title—militarist.

One thing is clear to us—or ought to be. It is that the neutrals in the U. N. are not neutral. They applaud or remain silent about actions perpetrated by the Reds. But they seethe and boil against any semblance of misbehavior in Western ranks. They have the balance of power in the U. N., so the future of the U. S. in that body should be clear. We no longer can expect fair and honest support.

The ironical thing is that the nation which protested the most violently has been guilty of doing what it was supposed to have detested—starting military action instead of exhausting negotiations. And this over a tiny dot.

The original U. N. policy is dead. All that remains is to inter it.

Tom Campbell

Editor-in-Chief

Outer space simulator

Photograph courtesy of NRC Equipment Corporation, a subsidiary of National Research Corporation.

made with Carlson Stainless Steel Plate

You are looking into a 55 ton ultra-high vacuum space simulator under construction. Now in service, this 2,800 cubic foot chamber, designed and built by NRC Equipment Corporation, a subsidiary of National Research Corporation, maintains a vacuum of 10^{-8} mm Hg. It tests vehicles, systems and sensors under space environment conditions at altitudes up to 300 miles at Fairchild Camera and Instrument Corporation's Defense Products Division, Syosset, N. Y.

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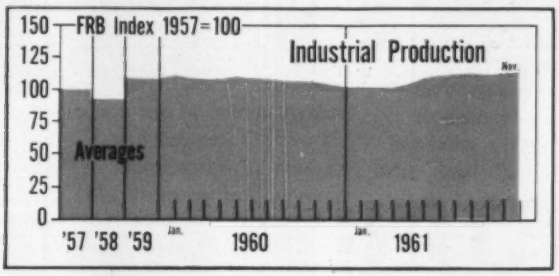
Production Mounts To New Peak

Industrial production soared to another record in November. This is indicated in the 114 reading of the Federal Reserve Board production index. The November mark is a full one percent higher than in October.



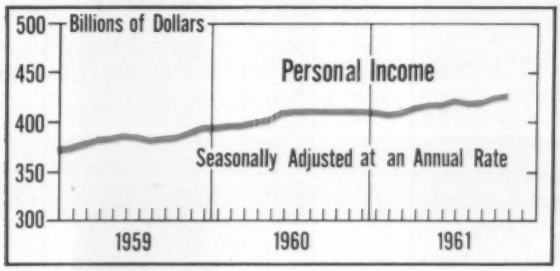
Behind the production rise is a big pickup in number of factory workers and a lengthening of the factory workweek to 40.6 hours, the highest in two years.

The industry with the biggest pickup was auto production. Auto assemblies were up 15 pct in the first month free of labor and model changeovers.

Personal Income: More Records

Personal income in November climbed to a new record of $429 billion, up almost $4 billion over October. The November rise follows a climb of $4 billion in October.

Commerce Secretary Hodges stated the income rise was "widespread throughout the economy." Some $2.5 billion of the rise was in wages and salaries. Another $750 million was in farm income gains. The rest was spread in dividends, transfer payments and interest.



Leaders in the $1.3 billion income rise in manufacturing were primary and fabricated metals industries and in electrical machinery.

1962: One Challenge Is Clear

If businessmen are largely cheerless in the face of the general recovery—and the prospects of continued recovery in 1962—it is because of the prospects of continued tight profits.

U. S. corporate profits have dropped from 4.3 pct on the sales dollar in 1951 to 2.7 pct in 1960. And most current earnings improvements look good only because the recent past profit picture has been so bleak.

One big reason for lower earnings has been that recoveries have been running shorter in the past decade. And these are the periods when industry largely reaps its earnings.

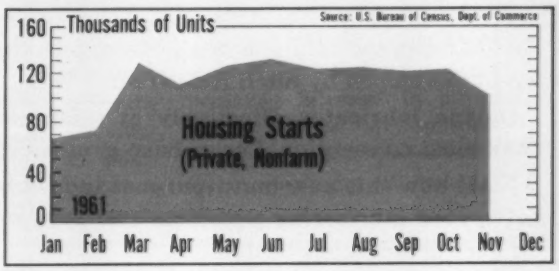
Behind the shorter cycles has been the failure of consumers to sustain buying of products.

All this points up what well may be industry's big challenge in 1962: To draw a larger portion of consumers' record savings into product buying. Consumer spending accounts for 65 pct of the GNP.

The real competitors will be elusive ones: Service spending, up 61 pct in last 10 years; savings, up 50 pct. Durable goods spending has risen less than 40 pct during this time.

Housing Falters In November

Housing activity faltered in November. Private nonfarm starts in the month totaled 100,900, down from



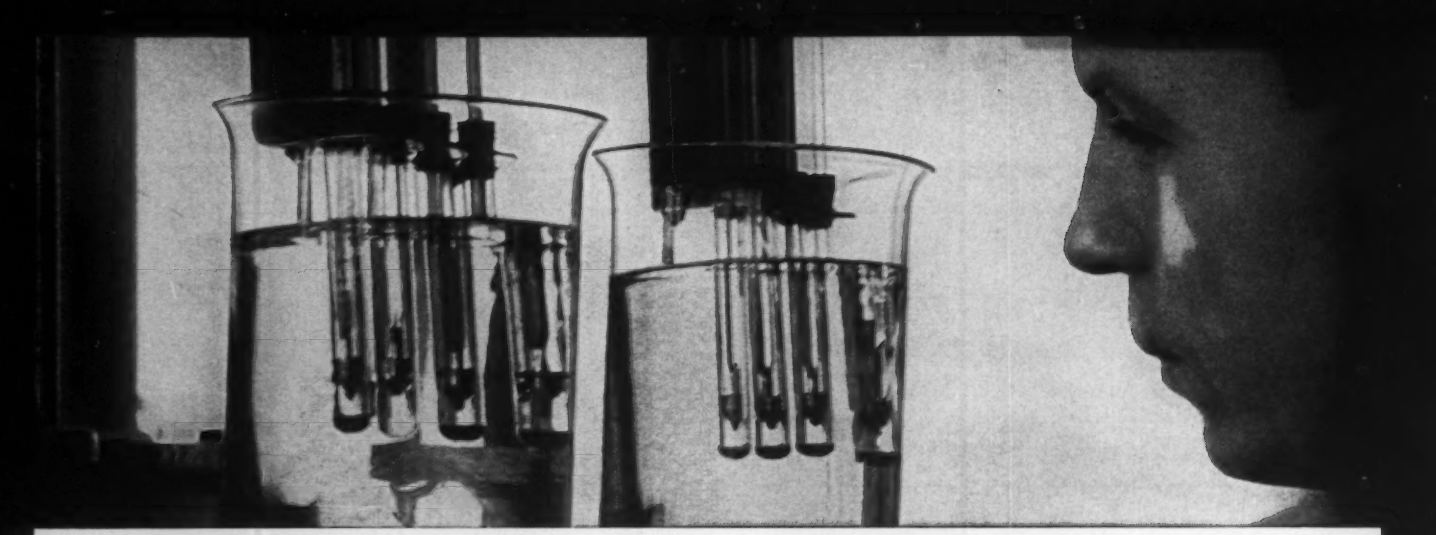
121,300 in October. On a seasonally adjusted annual rate basis, November starts reflected 1.3 million units. This is 5 pct under the October rate.

Housing remains spotty. Example: November housing starts rose 3 pct over October in the northeast section of the country; were down 12 pct in the north central section.

Durable Goods Orders Rise

A preliminary Commerce Dept. report shows that durable goods orders, seasonally adjusted, rose to a record $16.2 billion in November. This is up from $16.1 billion in orders for October.

Also, durable goods sales for the month rose to a record $15.8 billion, up $500 million for the month.



Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from left) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

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Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

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Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

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SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are helping to provide better products for industry

Organization Drive Makes Progress

The United Steelworkers organizing drive in the Cincinnati-Dayton area (IA, May 4, '61) is showing some signs of progress.

A National Labor Relations Board election will be held at Armco Steel Co.'s Middletown, O., works, probably in the next few months, as a result of a hearing in Cincinnati recently. An independent union now represents the workers.

Another election at American Radiator and Standard Sanitary Corp., with about 900 workers, is scheduled for Jan. 25.

District 25 director Albert Whitehouse said in Cincinnati that the union had "well over the necessary 30 pct" for a hearing. An 8-day hearing was held by the NLRB in Cincinnati and attorneys for both sides are now filing briefs. At issue, basically, is whether white collar workers shall be included in the voting. Within 30 days following the Board's decision, the election is to be held.

"We are now petitioning for only the maintenance and production workers who number about 4700," says Mr. Whitehouse. "We intend to separately organize the clerical, office, and professional employes later. We had an election in 1944 at Armco which we lost by only 95 votes and at that time there were many non-production workers included whom we feel swung it against us. This time we hope to organize these white collar workers separately."

"Hot Cargo" Clause Limits Extended

"Hot cargo" restrictions of the Taft-Hartley Act are being spelled out in rulings of the National Labor Relations Board. **And the effect, at least for the present, is that the scope of the restrictions is widened.**

As every employer knows, "hot cargo" clauses are those in which the employer agrees not to handle material from another employer, or even to stop doing business with another company, at union request.

Refusing to handle "hot cargo" has been a strong union weapon in the past. **Landrum-Griffin amendments to the Taft-Hartley outlawed these clauses, but the restrictions are now outlined more specifically.**

In the new rulings, the NLRB acted on contracts that required the employers to send subcontracted work to shops where the affected unions had contracts with the subcontractors, or shops approved by the union.

Steel Strikes Cost 1 Million Man Days

Since 1937 there have been six work stoppages in the basic steel industry involving over one million man-days. According to U. S. Dept. of Labor figures, 1959 stoppages produced the highest losses, with over 36.5 million man-days.

What Controls Employment?

Business representatives are telling Congress that industry should cease being the whipping boy for labor's unemployment problems. And some U. S. Labor Dept. officials are agreeing.

Ewan Clague, commissioner of labor statistics, told a Senate-House economic subcommittee that economic growth in industry alone cannot be expected to solve unemployment problems.

Mr. Clague says "special measures" must be taken to cut the current unemployment rate of 6 pct of the work force. These measures would be taken by the government. The commissioner says Federal training, guidance, and placement programs are as important in solving unemployment problems as faster economic growth.

Mr. Clague spoke at the joint subcommittee hearings on economic statistics. Industry representatives at the hearings also took the opportunity to present their case on unemployment.

George G. Hagedorn, research director of the National Assn. of Manufacturers, disputed the charge that automation and new products are causing high unemployment. Mr. Hagedorn blamed higher labor costs without compensating increases in productivity as well as "an insufficiency of savings within our economy" for the high rate of unemployment.

Emerson P. Schmidt, director of economic research for the U. S. Chamber of Commerce, told the committee that "government deeds and misdeeds" are to blame for much of the recent above normal unemployment. "The idea of government setting a target for annual wage increases is fraught with inflationary dangers," he said. The government, he added, "should examine its own responsibility for unemployment" in terms of an improved job-making climate, tax reform, and labor legislation.

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★Kennedy's Biggest Hurdle

The key to President Kennedy's 1962 legislative program lies in the hands of a single congressional unit —The House Ways and Means Committee. Major segments are of vital interest to industry.

The first battle on major Administration bills in Congress will occur in The Ways and Means Committee. The battling will be over:

President Kennedy's controversial program for liberalizing U. S. foreign trade policy.

A tax program giving business an investment incentive and plugging tax loopholes.

The Administration proposal for permanent improvement in the unemployment insurance program.

The proposed changes in Social Security to add medical care for the aged.

The House Ways and Means Committee handles all revenue measures. This gives it the unique position of acting first on almost all key legislation. The committee is traditionally conservative. It is not fond of loosening the purse strings. But it is also controlled by the majority party. And its chairman, Rep. Wilbur Mills, D., Ark., is usually on President Kennedy's side.

Mills support of the tax and trade measures will aid both bills. The Ways and Means Committee has already okayed a slimmed-down version of the President's tax plan. And the committee has a long history of favorable action on the reciprocal trade program. Both bills seem likely to get committee approval though the trade measure will be almost too hot to handle.

The President probably won't do as well on the other bills. The committee gives little support to changes in the unemployment insurance program. And the Administration's social security approach to medical care for the aged appears headed for the same shelf it ended up on last year.

Business has had its say on the President's tax proposal. But businessmen will get a chance to speak up on the other major legislation. Their support or lack of it could make a difference when they testify before The House Ways and Means Committee.

■ Committee Reports Support Free Trade

When a Congressional committee on foreign economic policy wrapped up its recent hearings, it had documented the case for a liberal trade policy.

The committee issued a series of ten reports. All overwhelmingly supported President Kennedy's call for a more liberal U. S. trade policy.

Rep. Hale Boggs, D., La., chairman of the committee, emerged as one of the President's top supporters in Congress. Boggs' position is that "failure to enact a trade program which gives our government flexibility in negotiating with the European Common Market could be disastrous for American business and American working men, and might very well drive a wedge between our country and our allies in Europe."

The ten reports came from such supporters as Christian Herter, former President Eisenhower's Secretary of State; Rep. Henry Reuss, D., Wis.; Otto R. Reischer, Washington trade specialist; and other top trade policy men.

■ Court to Decide Anti-Trust Fines

The U. S. Supreme Court will decide if maximum fines for corporation executives convicted in criminal anti-trust cases are $5,000 or $50,000.

The High Court agreed to review a lower court decision on which Federal anti-trust law — the Sherman Act of 1898 or The Clayton Act of 1914—should be used in charging company officials.

A Federal District Court ruled the Clayton Act should be used. The Clayton Act's top fine is $5,000. But the U. S. Justice Dept., appealing the decision, says the Sherman Act—$50,000—is applicable in charging executives.

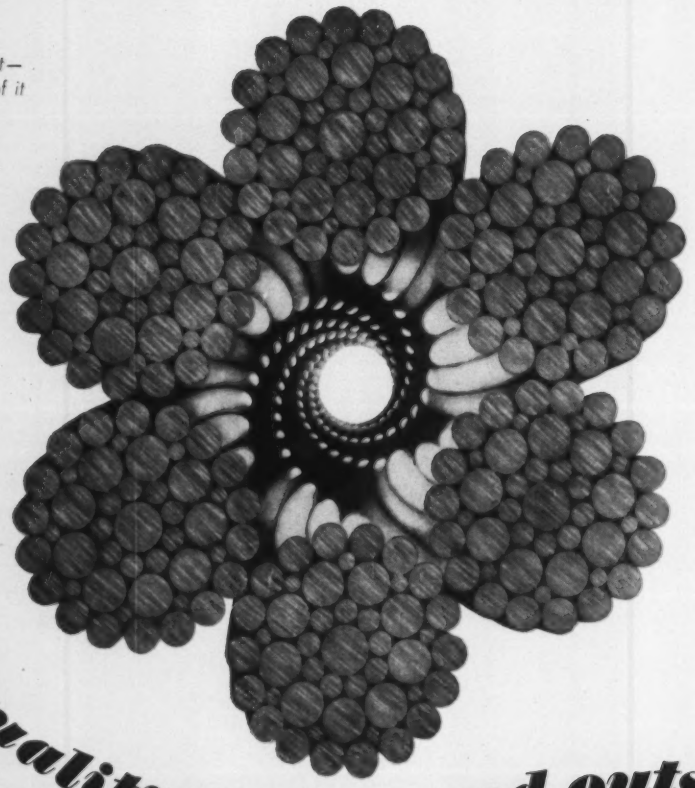
The case will have definite ramifications on anti-trust action. Since the controversy over the ruling began, The Justice Dept. has been indicting company officers under both acts. And Congress has been considering new legislation raising fines for convictions in anti-trust cases.

■ Cabinet May Have Urban Affairs Dept.

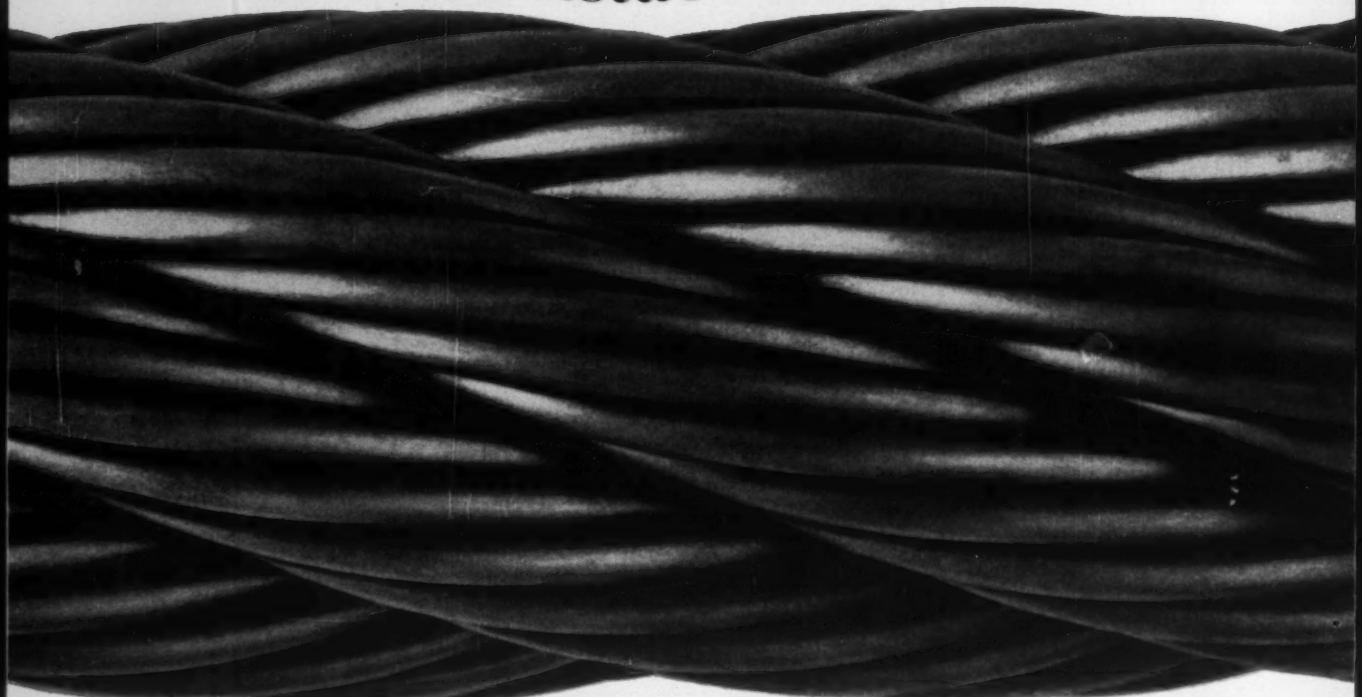
A cabinet-level Department of Urban Affairs and Housing is still a distinct possibility in the Federal government. White House sources say the President will push for early enactment of a bill to create the new department.

The scope of the new agency and its powers over Federal aid would definitely involve industry. It would cover these areas of Federal aid: Housing, urban renewal, urban highways, airports, water and water-pollution, defense industries, air pollution, and civil defense.

We put a lot of work into it—
You get a lot of work out of it



Quality inside and outside



Two important angles on wire rope savings: the *quality* and *uniformity* Roebling builds all the way through Royal Blue Wire Rope. They give you a big, extra margin of service through every kind of wear and tear — and combine to make extra strong Roebling Royal Blue the toughest wire rope you can buy. Find out more from your wire rope distributor, or write for free booklet to Roebling's Wire Rope Division, Trenton 2, N. J.

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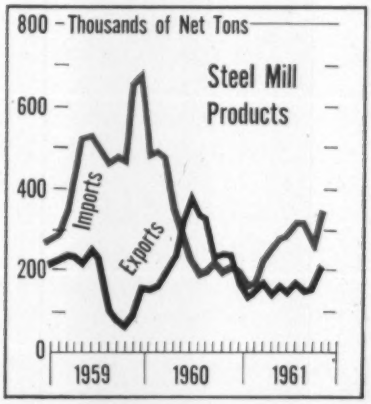
Steel Imports Still Threaten U. S. Role

Steel exports from the U. S. reached a new 11-month high in October. But imports also continued to climb, topping total exports for the 10th straight month.



By importing more than it is exporting, the U. S. place in the world steel market is in jeopardy. This was noted by Roger M. Blough, chairman of U. S. Steel Corp. "The U. S. is now importing more than a ton and a half of steel to every one we export, where formerly we exported from 3 to 5 tons for every one we imported," he said.

Industry observers differ on whether this upward trend will continue. But rolling mills now being built abroad indicate U. S. producers will face stiffer competition in flat-rolled products.

Exports totaled 208,000 tons in October, a 43,000 ton increase over September's level and highest in 11 months. However, for the first 10 months of 1961, exports totaled 1.6 million tons, which is 1 million tons below the 1960 level.

Imports rose from 269,000 tons in September to 335,000 tons in October. This was the highest level since March, 1960. Steel mill product imports for the first 10 months of 1961 totaled 2.55 million tons, compared with 2.9 million tons in 1960.

Competition from abroad has been a minor factor so far in big-tonnage flat-rolled product categories, such as cold-rolled sheet.

Imports of semi-finished steel, which have been rising since June, totaled 34,000 tons in October. Primarily steel slabs, they are rolled into sheets and formed into automotive fenders for re-export to Canada.

The rise in imports of other products is due to increased supply in Western Europe and Japan as a result of added capacity and a slowdown in local demand; cuts in foreign export prices; and some increase in demand in the U. S.

(For more on world steel production, see p. 24.)

Lower $ Helps Few Canadian Companies

The lower Canadian dollar has had only a marginal effect on import competition faced by Canadian companies. This is reported in a National Industrial Conference Board survey by its Canadian office.

Only a few companies note any easing of competition. About two-thirds anticipate no change in this area. Canadian manufacturers prefer a discount rate ranging from 3 to 5 pct for the dollar.

The cheaper dollar has not generally increased Canada's total export volume. But it has made some exports more profitable.

West German Slump

Two more West German iron ore mines are expected to close soon, and others may follow. They are casualties in the losing battle West Germany is waging with higher-grade imported ores.

U. S. Producers Top Machine Tool Gains

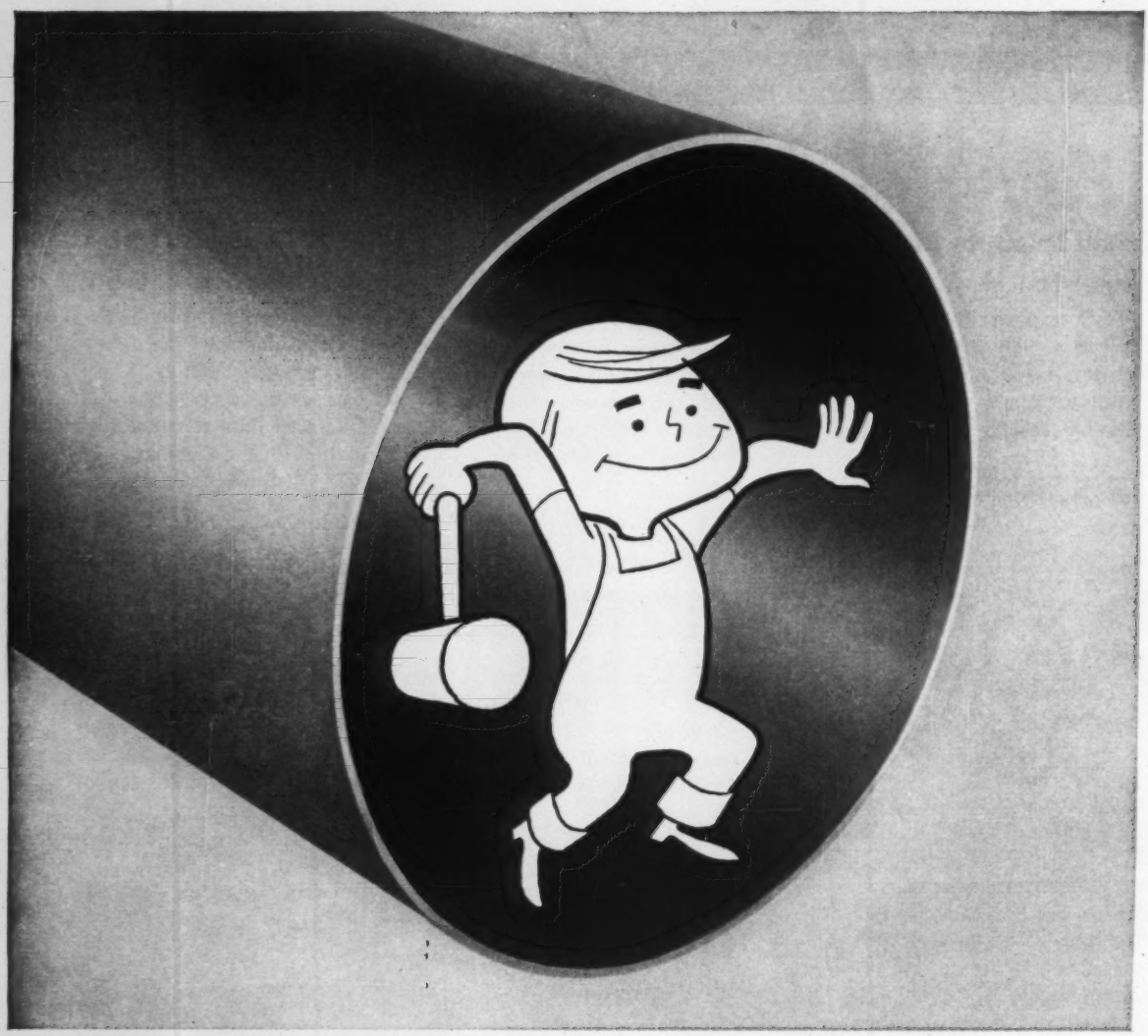
West Germany and the U. S. continue to dominate machine tool export markets. But U. S. producers have made recent gains well ahead of their German counterparts, according to the Commerce Dept.

U. S. shipments rose from $145.5 million in 1959 to $209.6 million in 1960, while West German exports increased from $200.8 million to $224.5 million.

West Germany continues to lead in total exports but the U. S. made stronger gains with higher sales to new markets in South America. Argentina was the largest single U. S. buyer in 1960, with purchases rising from $2.3 million in 1959 to $12.7 million in 1960.

Machine tool shipments from England, third largest exporter, grew from $67.2 million in 1959 to $82 million in 1960. However, Switzerland, fourth largest exporter, suffered an export drop, from $75.9 million in 1959 to $69 million in 1960.

Europe, Asia and North America remain the best customers of the major machine tool exporters. Orders to lesser industrialized nations are climbing and will open wider new markets in the '60's.

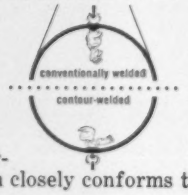


"The Gravity Kid" shows why

CONTOUR-WELDED TUBING OFFERS GREATER FATIGUE STRENGTH, LONGER SERVICE LIFE

Tubing fatigue strength depends largely *on how the tube is welded*, and the results obtained. Tubing that's smooth inside – free of flaws and bulging weld beads – offers much greater fatigue strength and longer service life.

Contour-welded* *tubing is smoother inside* than conventionally-welded tubing. It's smoother because *it's welded at the bottom*. Gravity pulls the metal down so that the weld corresponds to the tube's inside contour. There's no bulge on the inside surface. Even on the outside, the seam closely conforms to the tubing shape.



Contour-welding provides greater strength than conventional welding, because in conventional welding, gravity pulls the molten metal down into the tube. This can form a bead that is difficult to remove by cold working. And cold working can lead to deep, sharp undercuts that seriously weaken the tube.

Contour-welded tubing is smoother than seamless, too. That's because it's formed from uniformly rolled strip steel; whereas, seamless is produced by extruding or piercing. This strip is 100% inspected. So, there are no undetected tears or fissures inside.

See for yourself why Contour-welded tubing offers greater fatigue strength, longer service life. Write today for our free 48-page manual which describes tubing sizes from 1/8" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy, and Hastelloy**.

*U.S. Patent 2,716,692

**Trademark Haynes Stellite Co.

TRENTWELD® Stainless and High Alloy Tubing

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Beryllium Impurities

Impurities in commercial beryllium strongly affect the metal's mechanical properties. That's the gist of a recent AEC report on the subject. Apparently, precipitation of impurities is responsible for the changes in both electrical resistivity and mechanical properties. Dissolved impurities have the most harmful effects.

Another Material for Cans?

Two major steel producers are making a move that could result in a new candidate for the tin can market. Pilot-plant production of vacuum-metallized steel is slated for 1962. The tin can contender? Steel with an ultrathin aluminum coating. Development of a continuous vacuum-metallizing process makes it feasible.

Smog and the Automobile

Metalworkers may have to come up with yet another answer to the automobile air-pollution problem. California's proposed anti-smog devices for autos are only going to substitute a new kind of air pollution for the old, according to newly-published studies by a Stanford University expert. Unless the devices remove nitric oxide as well as hydrocarbons from exhaust gases, a higher level of toxic nitrogen dioxide will replace many of the present smog pollutants.

Fast Cure for Enamels

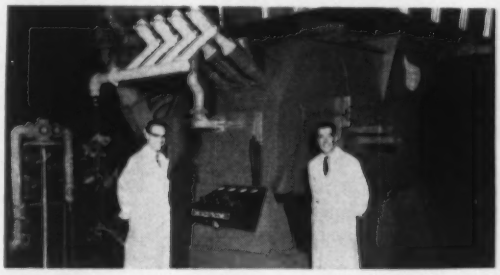
New industrial enamels can be cured or baked in 24 seconds, using special heating equipment. The rapid cure results from exposure to "far" infrared radiation. Thermosetting acrylic polymers are of particular interest in this cure medium, because they tolerate intense radiation.

Ore-Leaching Device

An apparatus developed by Bureau of Mines' metallurgists continuously leaches metals from coarsely-ground ores. With Department authorization, the apparatus can be manufactured and used in the U. S. without royalty payment. Termed a "centercurrent system," the original device consists of a large, segmented, rotating drum in which ground ore moves in one direction, while a leaching liquid moves the other way.

New Foundry Furnace

Foundries may be able to solve their air-pollution problems through the use of a new gas-fired furnace. In recent air-pollution tests on the West Coast, the furnace proved 98 pct efficient. The



GAS-FIRED FURNACE: Curbs air pollution.

new system also features a combustion-oxidation setup that insures high temperatures, low sulphur content and grain refinement. Normal tap-out temperatures are 2800°-2850°F. Metal recovery averages about 98 pct.

Gaging Productivity?

Despite the controversial nature of productivity, international trade unions are trying to reduce it to a mathematical formula. They have developed ratios expressing classic economic factors such as the productivity of labor, raw materials, energy and capital. In Europe, where government sits at the bargaining table, this statistical approach may serve an important function. Look for more efforts to find some formula that applies to U. S. production.

Blocks Tungsten Oxidation

In a recent Air Force study, a carbon disilicide coating won the title of "most promising." It guards tungsten wire against oxidation at temperatures as high as 3300°F for periods of up to 10 hours. The coating forms a viscous glass film on the wire surface in this high-temperature zone. However, there's a "serious drawback" in its low-temperature oxidation resistance.

FATIGUE CRACKS

Exciting Year

Well, 1961 is just about history. In pausing to reflect on it, we think it was a pretty good year.

Probably never before has the Iron Age expended as much editorial effort to keep you informed of the news and technical developments vital to metalworking.

Issues and Explosions—A couple of new series were launched in the past year: One was The Vital Issues Facing Management, featuring interviews with important people in industry and government outlining these issues and what can be done about them.

Another was the series on Metalworking's Technological Explosion. Not only did these articles cover in detail the explosion in four important fields, but they were illustrated in color. The subjects covered were: Steel making, Materials of the Future, Power Systems, and Forming.

All of these have been reprinted and the hundreds of requests for reprints testify to their importance and reception. Technical editor John Obrzut directed this work.

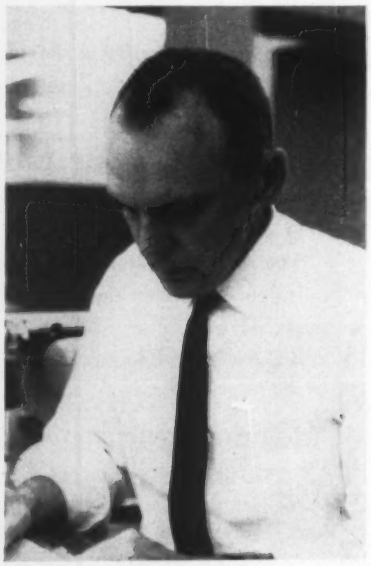
Spending Surveys — We've also continued our quarterly survey of capital appropriations by the metalworking industry, with the latest appearing in this issue on p. 28.

This survey, conducted for Iron Age by the National Industrial Conference Board is a valuable forecasting aid.

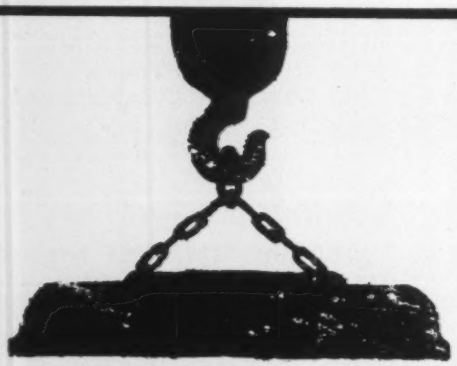
Market Survey — Another area we'd like to call your attention to is our Steel Summary, a weekly report on the current steel market and outlook. With our staff of regional reporters and home office men covering the market like a blanket, we've been able to call the turn on the steel market well in advance of its actual upturns and downturns. News editor Richard Raddant says that of all the news staff work, he thinks our summary best represents a collective effort in bringing to our readers important news first.

In addition, we had four important series reported from abroad. Editor George F. Sullivan hit the common market countries. Managing Editor Eugene C. Beaudet reported from W. Germany. Editor-in-Chief Tom Campbell made two visits to Japan, with on-the-spot reports from each trip.

OBRZUT: Directed the Technological Explosion series.



RADDANT: The Steel Summary calls the market turn.



FOR QUICKER PICK-UPS ...

Heavy-duty hoisting equipment re-engineered by POLLOCK—and rebuilt for speed. POLLOCK puts new life in a used crane's performance by increasing bridge speeds, lifting speeds. By installing larger motors, new A.C. electrical systems. By replacing worn bearings with smooth, modern, anti-friction bearings. Cranes, cabs, trolleys, bridges—all custom re-designed to meet the requirements of your shop.

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Khrushchev's Goal

Sir—Your editorial of Nov. 16, "Portrait of Khrushchev: Cunning, Dangerous and Brutal" is timely and hard-hitting. Let us hope that more editors will follow your example in speaking out on what is a most serious situation facing all of us today. Most people in industry are too involved in their own day-to-day business problems to give much serious time, thought and action to the real battle. Maybe more editorials such as yours, reaching into the offices of industry, will awaken some of them.

However, I cannot help but take exception to your remark—"He (Khrushchev) uses their words knowing well that many may fall for this pseudo sincerity and studied hypocrisy." Make no mistake. Khrushchev is probably the most sincere man in the world today, and least of all a hypocrite.

Khrushchev has publicly stated clearly and unequivocally the goal of the Communist—world domination and renouncement of a Supreme Being. This certainly is not the way of a hypocritical man. Khrushchev will say anything and do anything to reach the goal. Let us not confuse the means to an end with the end. Let us not mislabel Mr. Khrushchev, but let us recognize him for the sincere, dedicated, capable, atheistic, brutal murderer that he is.—Richard H. Bowden, Glen Ellyn, Ill.

Foundry Profit Pinch

Sir—We refer to your article on the foundry profit squeeze. We recognize it as one of the most concise points of fact we have read to date and would appreciate knowing, at your earliest convenience, if we may obtain reprints for our immediate distribution.—E. W. Connelly, sales manager, Production Pattern & Foundry Co., Chicopee, Mass.

Sir—I read with great interest your article on "Foundry Profit Down; Pinch On" (IA, Dec. 7, '61).

I think this was an excellent article and should be read by consumers of gray iron castings.

Would it be possible for me to purchase reprints of this article, so that we might pass them on to our customers?—Harry K. Sleicher, president, Seaboard Foundry, Inc., Providence, R. I.

▪ **Free reprints are on the way.—Ed.**

Trojan Horse

Sir—If you had read "Tito, Moscow's Trojan Horse" by Slobodan M. Draskovich before publishing the article (Yugoslavia's Industrial Plans Outrun Financial Growth, IA, Dec. 7, '61), I doubt very seriously that you would have said, "Yugoslavia has made much economic progress since it broke with the Comintern. . . ."

There is documented evidence in this book to prove beyond any doubt that the Comintern broke with Yugoslavia for the sole purpose of creating a "Trojan horse" that would have great appeal to our so-called liberals (actually collectivists). A statement such as yours clothes this liberal fiction with respect it does not deserve and will only harm us.

I strongly urge you to search out this book before you do any additional innocent damage to our fight for survival. If you cannot locate it in your library or a bookstore (the book was published in 1957 by Henry Regnery Co.), I shall be happy to lend you my copy.—James H. Plankenhorn, Glenview, Ill.

W. C. "Bill" Pine, our chief metallurgist says . . .

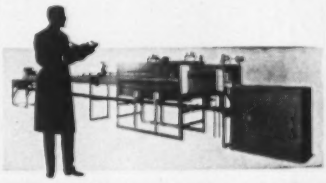
production-proved LAC-200 Series furnaces pay dividends on precision

BRAZING

Talk about controlled heat . . . easy operation . . . versatility . . . economy — and you're describing a Hayes Model LAC-200 Series Conveyor Brazing Furnace.

MULTI-ZONE HEAT CONTROL permits exact settings of temperature profiles — for quality work on each brazing, alloying, metal bonding or soldering cycle. When working with parts of unequal section, a pre-heat zone insures stabilized heat throughout the mass.

CONSTRUCTION MATCHES THE JOB. If an exothermic atmosphere is to be used, open chamber construction reduces equipment cost. For more refined atmospheres, muffles are available, which provide a baffling action to prevent creeping of temperature profiles.



WORK HANDLING IS EASIER, too, with a Hayes Model LAC-200 Series Furnace. Loading tables combine with constant belt feed to make this a remarkably high-production unit, per dollar cost and per foot of floor space.

VERSATILITY COUNTS. While designed for brazing, your Hayes furnace can double for annealing, hardening, and other heat treat operations. It's a bull for work!

WHATEVER YOUR BRAZING NEED — from silver (1100°F range) to platinum (3400°F range with type M-Y or Vacuum Furnaces), Hayes know-how in equipment and engineering can come up with a RESULTS GUARANTEED answer . . . tested in our lab. on full-production equipment . . . proven by scores of successful installations in industry. Bulletin 5711A gives LAC details. For your copy, write C. I. Hayes, Inc., 821 Wellington Ave., Cranston 10, Rhode Island.

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BATTLES 2000°-2200°F and Wins!

This is one of several bends cast of Duraloy HOM and now in service in high temperature radiant tube applications.

HOM is a special alloy developed by Duraloy Metallurgists for operation in the 2100°-2200°F range, with limited application up to 2300°F. HOM can be cast static, centrifugal or shell-molded. The resulting casting is of exceptional uniformity, density and strength.

We are in a position to make *single* castings of HOM up to about 10 tons or multiple smaller castings for assembly into any size or shape that can be handled by carriers. Much of our work has been along the lines of assembled units.

HOM is only a few years old but Duraloy's High Alloy Casting experience is 40 years old...and that's a lot of experience! Why not rely upon it for your casting requirements—static, centrifugal or shell-molded.

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COMING EXHIBITS

Plant Engineering & Maintenance Show—Jan. 22-25, Convention Hall, Philadelphia.

Electrical Engineering Show—Jan. 29-Feb. 2, New York Coliseum.

MEETINGS

JANUARY

Reliablity and Quality Control—Eighth national meeting, Jan. 9-11, Statler Hilton Hotel, Washington, D. C.

National Barrel & Drum Assn.—Annual meeting, Jan. 11-13, Americana Hotel, Miami Beach, Fla. Assn. headquarters, 1343 L St., N. W., Washington, D. C.

Institute of Scrap Iron & Steel—Annual convention, Jan. 14-17, Statler-Hilton Hotel, Washington. Institute headquarters, 1729 H St., N. W., Washington, D. C.

Assn. of Consulting Management Engineers, Inc.—Annual business meeting, Jan. 15, University Club, New York. Assn. headquarters, 347 Madison Ave., New York.

Mining Symposium—University of Minnesota and Minnesota Section, AIME, joint meeting, Jan. 15-17, Duluth Hotel, Duluth, Minn.

Compressed Gas Assn.—Annual meeting, Jan. 15-17, Waldorf-Astoria Hotel, New York. Assn. headquarters, 500 Fifth Ave., New York.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 15-19, Mountain Shadows Hotel, Scottsdale, Ariz. Assn. headquarters, 105 W. Madison St., Chicago.

Industrial Heating Equipment Assn., Inc.—Winter meeting, Jan. 22-23, The Drake Hotel, Chicago. Assn. headquarters, 2000 K St., N. W., Washington, D. C.

Aluminum Assn.—Annual meeting, Jan. 24-26, New York. Assn. headquarters, 420 Lexington Ave., N. Y.

STEEL MILLS ARE REVISING UPWARD their estimates of losses due to better steels and better use of steel. One mill is predicting ingot output of 105 million tons next year. If 1955 steels were being used, says the mill, production would be 118 million tons. Use of tinplate in coils is said to be cutting material usage 7 pct. Another 7 pct is said to be lost to thinner tinplate.

OVERSEAS SALES OF U.S.-MADE MAJOR APPLIANCES have spurted ahead of last year's for at least one leading maker. J. F. Pieper, manager of major appliance sales, International General Electric Co., says his company's overseas appliance sales are running ahead of last year's by 20 pct. He credits stepped-up marketing efforts by IGE and improved foreign buying power.

A NEW FORECAST OF 1962 AUTO PRODUCTION by the Commerce Dept. points to a 6.4 to 6.8 million unit year. This is 17 to 24 pct over 1961 schedules. The forecast is in line with the 6.7 million unit sales forecast of the National Automobile Dealers Assn.

A TURNING POINT FOR RAILROADS may come in 1962, says D. P. Loomis, president of the Assn. of American Railroads. He bases this claim on the growing awareness of the critical rail situation by the Administration and the public. He says the railroads' rate of return on investment this year was 1.97 pct, the lowest since 1938--and the lowest of any major U. S. industry.

PURCHASE COMMITMENTS ARE BEING EXTENDED, according to an analysis made by the National Assn. of Purchasing Agents. Most extensions are in commitments of 90 days or longer.

A BETTER YEAR FOR MALLEABLE IRON CASTINGS is predicted by Lowell D. Ryan, executive vice president of the Malleable Iron Founders Society. He looks for a 13 pct increase in shipments. His forecast is based on a 6.6 million unit auto year and a 6-to-10 pct improvement in other malleable-using products.

•

TITANIUM PRODUCTION for the year is well ahead of 1960. Mill products in October were up 294,000 lbs over the same month last year. Titanium production for the year, at 9.3 million lbs, is up 1.5 million lbs over the 10-month total for 1960. A sharp increase in aircraft production is believed behind the gains.

"WHO'S WHO" in METALWORKING!

AMONG USERS OF *VOSS* LEVELERS:

- Aluminum Company of America
- Anaconda American Brass Company
- Armco Steel Corporation
- Avco Corporation
- Bethlehem Steel Company
- Dow Metal Products Company
- Fairmont Aluminum Company
- Fruehauf Trailer Company
- General Fireproofing Company
- Granite City Steel Company
- Inland Steel Company
- Jones & Laughlin Steel Corporation
- Kaiser Aluminum & Chemical Corporation
- R. C. Mahon Company
- Mirro Aluminum Company
- National Cash Register Company
- National Steel Company
- Quaker State Metals Company
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- Reynolds Metals Company
- The Youngstown Sheet and Tube Company
- United States Steel Corporation
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You owe it to your competitive position to investigate the overwhelming advantages of Voss precision inverted roller levelers. Users know that Voss levelers enable them to equal or exceed stretcher leveler flatness at high production speeds. Applications of Voss levelers include high speed galvanizing lines, hot and cold rolled shear lines, steel plate, missile steel, tinplate, aluminum, copper, brass and other non-ferrous metals.

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MEMBERS OF NLRB: Backed by the Administration, the NLRB has speeded up its handling of cases.*

'New' NLRB Sounds Warning At Industry and Labor

The Board has dusted off an old weapon known as "10 J" against labor law violators.

With court backing, the NLRB is also cutting deeply into its big backlog of cases.
By R. W. Crosby

■ A new era of enforcement of Federal labor laws has begun. The Government's labor law administrator, the National Labor Relations Board, has stepped up its campaign against unfair labor practices of both employers and unions.

The move is in line with President Kennedy's policy of speeding up actions by the Federal regulatory agencies.

The NLRB is not only speeding up its handling of new cases. It also is moving fast enough to cut into its huge backlog. The Board is using new weapons against labor law offenders. And it is getting more support from the courts. As Board Chairman Frank W. McCulloch puts it, the NLRB is using a "bigger stick."

Warning Sounded—What arises from this power move by the NLRB is a warning to both unions and employers who flaunt the labor laws. No longer will there be "profit in unfair labor practices" because of ineffective and soft NLRB rules and penalties.

The Labor Board is heeding the words of Congressman James Roosevelt. He said the remedy for repeated and willful violations of the labor laws is "to make the

*NLRB board members (left to right): John H. Fanning, Philip Ray Rodgers, Chairman Frank W. McCulloch, Boyd Leedom and Gerald A. Brown.

How NLRB Cuts Its Case Backlog

Here is the recent record of how the NLRB has whittled down its backlog of unfair labor practice cases since the backlog hit a record high last August.

Date	Backlog
August 1	466 Cases (Record High)
September 1	433 Cases
October 1	435 Cases
November 1	402 Cases
December 1	380 Cases

penalties for such unfair labor practices so doggone stiff that anybody who did it would think twice about it."

Here's what is happening in the NLRB push:

Quicker Decision — Labor case decisions are being made at a faster pace. The NLRB cut its backlog from a record high of 466 cases pending on August 1 to 402 on Nov. 1, and then to 308 on Dec. 1. Last October the Board issued decisions in more contested unfair labor practice cases than in any other month in its 26-year history.

A major speed-up action was taken in May when the Board delegated broader decision-making powers to its 28 regional directors. The new powers allow the regional directors to process employe representation election cases. The powers were previously exercised only by the five-member board in Washington. Mr. McCulloch said the move "promises to be one of the most far-reaching steps the Board has ever taken with respect to its election cases.

"It should provide a major speed-up in NLRB case handling in line with the policy of President Kennedy for the independent regulatory agencies. By relieving the Board of a substantial part of its total case load in the future, the new plan will free the Board to reduce its large backlog and dispose of its other cases involving unfair labor practices more promptly and carefully."

Time Saver—So far, this move has cut in half the time it takes to process an employe election case. Last year it took 90 days to process such a case. The current rate is 44 days.

In a sharp departure from past practice, the NLRB has dusted off a little-used weapon against labor law violators. This is the "discretionary" injunction procedure, better known as "10 J." It authorized the Board to petition a district court for "appropriate temporary relief or restraining order" in respect to any unfair labor practice, whether committed by an employer or a union. It is called "10 J" because it is covered in section 10 J of the Taft-Hartley Act.

In the past the NLRB requested few 10 J injunctions, only 48 in the past 14 years. More extensive use of discretionary injunctions will allow the NLRB to correct unfair labor practices before substantial injury is done. By using the injunction the NLRB can order a temporary halt of the labor practice in question while long hearings and litigation are underway.

Court Backing—Recent uses of 10 J have been supported in the courts. In December, for instance, a district court in Texas directed a manufacturing firm to reinstate employes allegedly discharged for union activities in action on a 10 J injunction. The workers went back to work pending the outcome of NLRB hearings.

Last year the NLRB filed five petitions for 10 J injunctions. One was against an employer, three against unions, and one against both the employer and the union. This year, say NLRB officials, the number will be "substantially larger."

Mr. McCulloch lists the areas of union and employer activities where the temporary relief of a 10 J injunction may be used. He says they would be sought against unions for: Serious picket line violence; striking without timely notice to the mediation services; and efforts to secure an illegal closed shop. They would be sought against employers for: Illegal discharges of employes for union activities; anti-union campaigns designed to stifle organizational drives; and refusal to bargain.

High Court's Ruling—The U. S. Supreme Court has just upheld the authority of the NLRB to issue consent orders without filing findings supporting the order. The court thereby reversed an Appeals Court ruling that had limited the scope of an NLRB order barring a company and union from unfair labor activity.

Recent cases and actions of the NLRB are setting new precedents in dealing with unfair labor practices.

In one case, the Board tightened the ban on "hot cargo" agreements. It ruled that the "hot cargo" prohibition applies to work done by subcontractors. In "hot cargo" clauses in labor-management contracts, the employer agrees not to do business with any firm with which the union is having labor problems. In its decision, the five-member NLRB held unanimously that a union cannot seek to enforce a contract clause forbidding an employer to parcel out work to non-union firms.

In another far-reaching case, the Board established a one-year, no-picketing rule in cases where it finds unions engaged in unlawful picketing after losing elections for employe bargaining rights. The Board said that the one-year ban would date from the time the picketing found to be illegal stops.

Caseload Problem — The Board still faces the problems of a growing caseload. From an average of 13,000 filings of cases in the first ten years of the Taft-Hartley Act, the number has jumped in the last four years to almost 23,000 a year.

Appliance Industry Eyes Europe

Most Manufacturers Predict Big Sales Gains in 1962

Exports of coin-operated equipment to Europe are beginning to pick up and show promise.

Coin-operated dry cleaning machines in the U. S. are called the hottest item by some.
By K. W. Bennett

■ Year-end statements from the appliance industry indicate one general trend—up.

The appliance makers see 1962 as a big replacement year. The National Electrical Manufacturers Assn forecasts an all-time high for major appliances in 1962 with 10,615,000 units produced. That's 5 pct over the number shipped in 1960.

Among the big dollar earners: Electrical refrigerators, freezers, ranges, room air conditioners. Dehumidifiers are expected to gain by 14.7 pct. Home laundry equipment, which accounts for more than 30 pct gain in gas appliance sales, will share in the gains. The American Home Laundry Manufacturers Assn predicts a 5 pct gain next year over 1961.

Gas Appliance — Gas appliance manufacturers are more conservative. They expect a minimum 4.2 pct gain in gas appliance sales, but admit it could reach 8.9 pct. Central heating is pegged for an 8.3 pct upswing.

Prices are expected to continue to firm. Everybody needs the earnings.

Areas to watch in '62: Exports and coin-operated equipment.

Eye European Market—Maytag indicates it is moving into the European coin-operated laundry equipment market. The thinking is that a European housewife will grow to like American automatic appliances at the local public laundry and may become an eventual buyer.

Speed Queen Div., McGraw Edison Co., is a big producer of coin-operated laundry equipment. Two weeks ago it entered the coin-operated dry cleaner market. It's also eyeing the European market.

Others with the same intent are Frigidaire Div., General Motors Corp.; Philco Corp.; and Westinghouse Electric Corp.

The coin-operated dry cleaner has been called the hottest new appliance by some.

Tieup With Sears — Whirlpool Corp. is reported working with Sears Roebuck to have the units installed in the Sears store system. Meanwhile, RCA Whirlpool reports in its first six months of sales it had 400 automatic drycleaners installed.

Figures for the industry on the export outlook for retail equipment aren't yet clear. But some manufacturers report surprising gains. One mentioned a 25 pct export gain.

From a poor first half, the appliance industry managed to crowd a good share of 1961 business into the late second half.

PUSHBUTTON DRY CLEANING: Automatic dry cleaners are among the hottest new appliance items. Here a Washington, D. C., family tries out one of the Norge do-it-yourself units.

Japan Gains in World Steel Race

Soviet Union Also Increased 1961 Output

During 1961 Japanese steelmakers boosted output more than 30 pct over 1960.

World-wide trip by U.S. wire-making executives shows Japanese "think big," will spend on plants to boost volume.

■ Japan continues to boost its share of the world's steel output. During 1961 it's estimated by The Iron Age that the Japanese increased production to 32 million tons, a gain of more than 30 pct over '60. Since 1950, Japanese steel output has moved up more than 500 pct, rising from 5.3 million tons to this year's 32 million.

Russia Gains, Too — Among other leading steel producing nations, the USSR also increased output last year. Three others of the "Big Five"—The United Kingdom, United States, and West Germany—remained about at 1960 levels.

These facts are revealed in an Iron Age analysis of steel output of more than 25 producing nations. The analysis, extending back to 1950, will be published in complete detail in next week's annual issue.

It shows that in the last eleven years world steel output has almost doubled, advancing from 1950's 204.2 million tons to an estimated 399.4 million tons for 1961. Most spectacular was the rise of Japan.

Advances for Others—But other nations shared in the increase. Among those making sizable gains, beside those already mentioned: Brazil, Canada, China, France, Italy, Poland and Sweden.

The progress of other nations in steel production techniques was detailed in recent talks by David Schmid, president of Techalloy Co., Inc., Rahns, Pa., and Ralph Cubbler, the company's vice president and partner.

Globe-Girdling Trip — The two men recently completed a world-wide trip to study foreign methods of making strip and wire. The trips are part of Techalloy's policy of research to improve its own techniques.

Techalloy is a large producer of high-nickel alloy wire and strip, also makes stainless steel wire and strip, electrical resistance and glass sealing alloys.

How They Compare—Asked to compare foreign wire-making skill with ours, the executives gave this timetable:

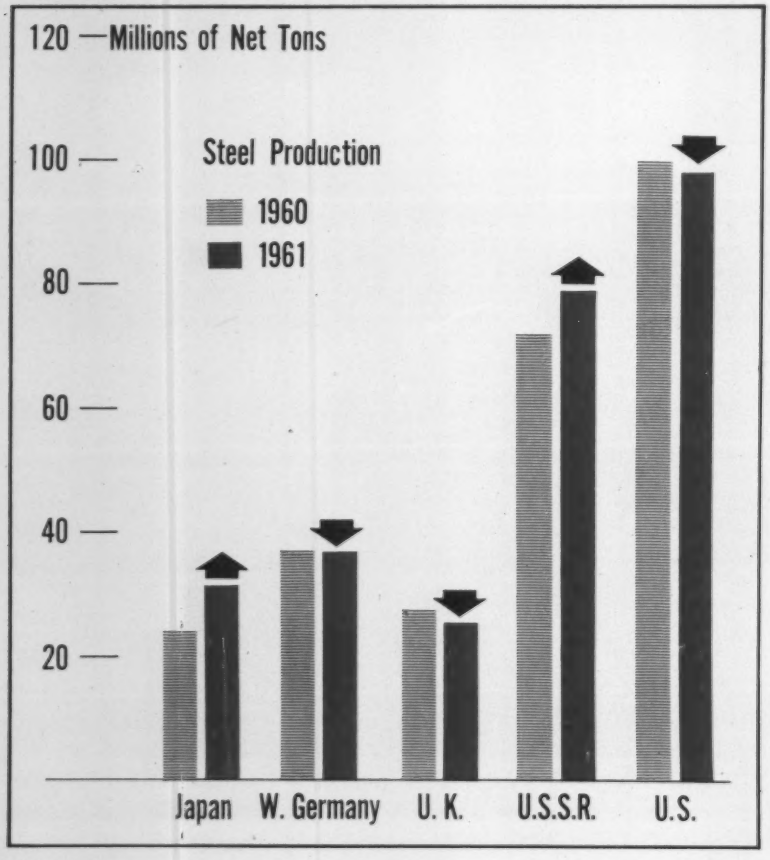
Japan: Moving ahead of England. Only "months" behind the U. S. in techniques. Willing to think big and set up huge plants to produce in volume.

England: Falling behind. About 5 years off the pace. There seems to be a lack in communicating ideas.

Sweden and Germany: Compare with the U. S. Export a large portion of their product.

Russia: About 20 years behind in techniques. Does not appear to be concentrating its know-how in this area of steelmaking.

How Steel Leaders Compare



INDUSTRIAL BRIEFS

European Distributor—Burgmaster Corp., Gardena, Calif., announces that Kearney & Trecker C. V. A. Ltd., Sussex, England, has been appointed a sales agent. The English company will have exclusive sales rights in Great Britain, the British Commonwealth and Western Europe.

Copper Warehousing — Chase Brass & Copper Co's. warehouse system will now operate as Chase Metals Service Div. Chase is a subsidiary of Kennecott Copper Corp.

Measuring Instruments — Durant Manufacturing Co. has opened a larger plant in Watertown, Wis. Executive offices of Durant will remain in Milwaukee.

Extrusion Design—C. B. Valliant of Peerless Mfg. Co., Dallas, has won the $2500 first prize in the nationwide aluminum extrusion design contest sponsored by Kaiser Aluminum & Chemical Sales, Inc. Rogers Industries, Detroit, will also give Mr. Valliant $500.

Mine Study—The Dept. of the Interior has started a two year study of health and safety conditions in metal and non-metal mines. Purpose of the study is to find out what kinds of health and safety programs are being used in mines.

Precision Components — Elmwood Tool & Machine Co., Inc., Elmwood, Conn., has formed an affiliate, Radke Engineering Inc., to produce precision component parts.

Specialty Tools—Ideal Precision Meter Co., Brooklyn, N. Y., has acquired the M&R Machine Shop of Elmhurst, L. I. The purchase will give Ideal integrated facilities for manufacturing tools, dies, stampings and screw machine products.

Conveyor Belting—The Ralphs-Pugh Co., Inc., San Francisco, has formed the Perfection Belting Co., Div., to fabricate specialty conveyor belting for product handling.

Technical Assistance — Jones & Laughlin Steel Corp. signed a technical assistance agreement with Kloeckner - Werke AG, Duisburg, Germany. J&L will assist in planning for production of cold-rolled stainless steel products at Kloeckner's Bremen plant.

Transmission Drives — Zurn Industries, Inc. and E. W. Bliss Co., Canton, O. have completed negotiations for the purchase by Zurn of the American/Bliss Flexible Spindle Div. of Bliss. Zurn spokesmen call the purchase a step towards covering the total market for power transmission drives.

Tool Sales—Jefferys Engineering & Equipment Co., Greensboro. N. C., will occupy new quarters in early 1962. The new building includes engineering and sales offices and a large display area for the machine tool builder's lines which the company sells.

Inorganic R&D — The Glidden Co., Cleveland, announces plans to spend a quarter of a million dollars to expand the Baltimore facility of the company's Inorganic Research and Development Center.

Sales Offices—Fairbanks, Morse & Co. is building five combination sales offices and service shops across the nation. Construction is in Dallas, Baltimore, Omaha, New Orleans and Buffalo.

Electronics Parts — Alloys Unlimited, Inc., of Long Island City, N. Y., purchased MonoSilicon, Inc. as a subsidiary. Alloys will add MonoSilicon's products to its line.

Automation Controls — The Aro Corp., Bryan, O., has purchased Modernair Corp., San Leandro, Calif., and will operate it as a subsidiary. The addition of Modernair's product line gives Aro a better position in automation controls. The Modernair line includes valves and cylinders powered by air or hydraulic pressure.

Threading Tools — Besly-Welles Corp., South Beloit, Ill., and Jones & Lamson Machine Co., Springfield, Vt., plan to market the tools of both companies through the Besly-Welles organization.

Italian Chemicals—Union Carbide Corp. announces an Italian plant for production of ethylene amines will be built by S. p. A. Celene, a company jointly owned by Union Carbide and Societa Edison.

Electron Beam—United Aircraft Corp., Hamilton Standard Div., has purchased the stock of Hamilton-Electrona, Inc., of New York. Hamilton holds exclusive North American rights for the Hamilton-Zeiss electron beam machine.

Aerial Survey—Litton Industries has acquired Aero Service Corp. of Philadelphia. Aero Service will work closely with Litton's Western Geophysical Co.

Electric Furnace — Union Carbide Metals Co. plans to add an electric furnace to its Marietta, O., facility. The new furnace will begin producing ferroalloys late in 1962.

Chemical Research — Pennsalt Chemicals Corp. plans to complete an eight million dollar research and development complex in King of Prussia, Pa., by mid-1963.

Italian Plastics—Synthane Corp. has made a licensing agreement with MAS, a subsidiary of Fratelli Marchi, Italy. It provides MAS with manufacturing and marketing rights for Synthane plastics.

maximum tube life per dollar—When you buy Timken® seamless steel pressure tubing, you receive fine forged quality that is uniform from heat to heat, tube to tube, order to order. We target it to your end use. And our metallurgists draw from a background of over 40 years' experience to help you select the one tube that will give you maximum tube life per dollar.

Timken seamless steel tubing is available in carbon, alloy and stainless grades, up to 11″ O.D. and 3¼″ wall. And there's a Timken seamless steel pressure tube to meet practically any combination of temperature, pressure or corrosion. For help that assures your selection of the one tube that will be most economical and perform best for you, call in Timken Company metallurgists. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.

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Why Business Ethics Are Thorny

Business received a lot of criticism about its morals during the year just ending.

Industry, troubled about the issue, is working on the problem. But ethical concepts are growing more complex.

■ The year just ending was a bad one for business ethics. Price collusion charges, cases of conflict of interest and other matters combined to give industry a public black eye.

But much remains to be said in support of business—and its present position. Only a small minority of U. S. businessmen and companies were involved.

Codes Endorsed — Many businessmen have been deeply concerned about questions of ethics and actively working to improve attitudes and conditions.

A recent executive survey reported by the Harvard Business Review shows 71 pct questioned believe a business code would raise the ethical level of industry. In addition, 81 pct feel a code would help executives by clearly defining the limits of acceptable conduct.

A committee, made up of prominent public leaders from business, religion, and educational areas, is working on a statement of philosophy and a set of questions for businessmen to ask themselves about their operations. A Business Ethics Advisory Council was set up in the Dept. of Commerce.

Management's Role—Every employee plays a part in enforcing good moral conduct in business. But management bears a heavy responsibility. Secretary of Commerce Luther Hodges stressed this in a recent speech.

"The hard fact," Mr. Hodges noted, "is that the conduct of any organization can be no better than that of its individual members. The uprightness of everyone counts, but most especially the top executives must assert the need for morality, establish patterns, and set the examples. Top management has the power and the duty to develop standards and enforce ethical rules of conduct.

"It's true that the growing complexity of corporations makes personal supervision difficult. But this same complexity makes it all the more urgent that management clearly define and communicate ethical standards for all employees. And management itself must lead the way to observance."

The problem of business ethics is a lot more complicated today than it was ten, twenty, or thirty years ago. Business conduct has progressed a long way from the laissez faire days. Today's efforts to do the right thing for the company, the stockholders, employees, and the general public pose tough ethical dilemmas for business.

Dilemmas Businessmen Face

■ The conflicting pressures on business were recently pointed out by Theodore V. Houser, former chairman of the board, Sears Roebuck and Company.

Commenting in the Atlanta Economic Review, he stated, "On the one hand are people who believe U. S. business managers must not only have a sense of public and social responsibility, but must act that way.

"Opposing this view are those who contend that management must hold unswervingly and exclusively to the immediate profit objective. This would keep corporate operations a thing apart from community, educational, or broad social problems."

Social Responsibility — But he adds, in addition to making profits, business "has a responsibility to promote and support the social order by conducting itself in a socially conscious way and contributing to education and philanthropies as best it can."

Some of the ethical dilemmas modern businessmen face have been noted by Assistant Secretary of Commerce William Ruder.

In a recent speech he asked: Are all company gifts and entertainment of every kind and value, always unethical? Does a business giver always seek discriminatory favoritism?

Other Dilemmas—What constitutes conflict of interest? Where is the place to draw the line? Other thorny decisions involve: Plant relocation and its effects on employees and the community. The effects of automation.

Questions can, of course, be resolved wholly on economic grounds. But, says Mr. Ruder, many managers recognize that social responsibilities are also involved.

Metalworking's Capital Spending Plans

No. 4 of a 1961 Series

Steel Leads Upturn In Capital Outlays

Contra-seasonal gains in third quarter capital appropriations brighten next year's capital goods outlook.

The steel industry boosted new appropriations 60 pct over the same quarter last year.

By E. C. Beaudet

■ The market for metalworking capital goods will show steady improvement in the early months of 1962.

Money set aside by metalworking companies for new plants and equipment in the third quarter came to $787 million.

Major gain—This is 16 pct higher than both the second quarter of this year and third quarter of 1961. And it is the first time since first quarter 1959 that capital metalworking appropriations gained significantly over the same period a year earlier.

These are the results shown by a survey of third quarter metalworking capital appropriations by metalworking companies conducted for The Iron Age by the National Industrial Conference Board.

The survey findings indicate a stepping up of the recovery in capital spending plans which began in the first quarter of this year. Since capital expenditures lead appropriations by three to nine months, a higher rate of spending for capital goods can be expected in the first half of 1962.

Leaders—Heading the comeback in capital appropriations are primary metals producers, makers of fabricated metal products and electrical machinery manufacturers.

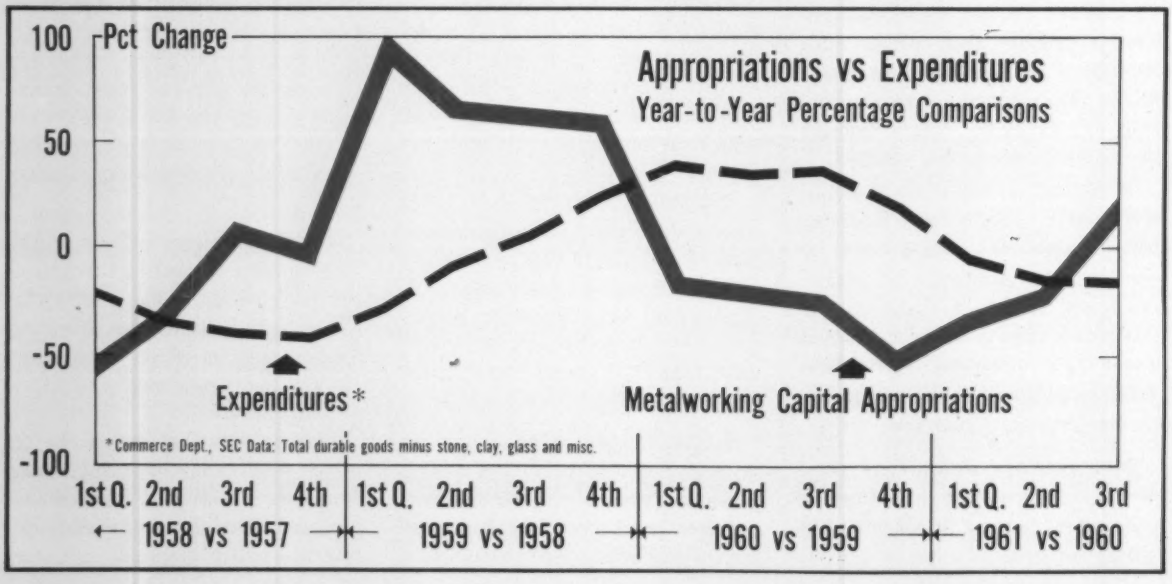
New appropriations by primary metals producers, which had declined in the second quarter, were the strongest factor in the third-quarter recovery.

Led by the iron and steel industry, primary metals producers boosted new appropriations in the third quarter some 60 pct higher than in the same quarter a year ago.

Hold Steady—Electrical machinery makers, another declining industry in the second quarter, also apparently gained ground in the third.

It cut third quarter appropria-

New Strength in Capital Appropriations



tions from a year earlier by only 3 pct, as against a 24 pct year-to-year cutback in the second quarter.

Makers of fabricated metal products registered a third-quarter gain of 15 pct in new appropriations as compared to third quarter 1960.

Seasonal Gains—Added to these positive signs of a recovery in capital spending plans, are the contra-seasonal gains in new appropriations for all metalworking industries from the second to third quarter.

The table at bottom shows that the five-year average decline in appropriations from the second to third quarter is 22 pct. However, in the third quarter of 1961 metalworking as a whole showed an actual increase of 19 pct in new appropriations over the second quarter.

Here again, the primary metals group was mostly responsible for the improved outlook. The five-year average decline for the industry is 19 pct. But in the third quarter of this year new appropriations by primary metals producers ran almost double those of the second.

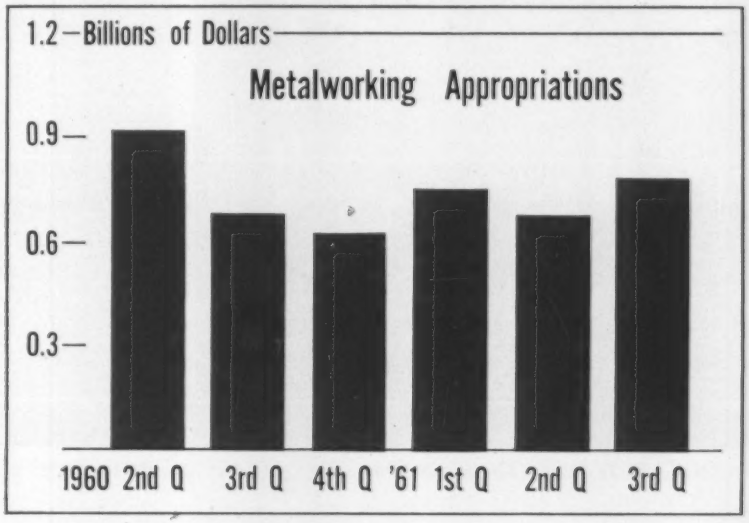
Beat Average—Other industries showing strong seasonal appropriations gains in the third quarter were fabricated metal products and non-electrical machinery. Electrical machinery and transportation equipment industries showed only slightly better than seasonal gains while instruments makers fell below the seasonal average.

The rising momentum of new capital appropriations is shown in the chart on p. 28. It compares percent changes in both metalworking appropriations and expenditures with year-earlier figures.

You'll notice that in the second quarter of this year the appropriations curve, heading upward, crossed the declining expenditures curve. As the appropriations curve continues to go up, expenditures will follow next year.

Along with these highlights of the third quarter report, following is a more detailed industry rundown of the trends in third quarter capital appropriations.

Base for Higher Spending



Primary Metals—Primary metals' appropriations gained sharply in the third quarter of 1961 on a year-to-year basis. This was primarily brought about by excellent gains in blast furnaces, steel works and rolling mills; rolling, drawing and extruding nonferrous metals; and nonferrous foundries.

This is partly the result of better earnings for iron and steel in the second quarter. The industry's net profits after taxes in the second quarter of 1961 were more than twice as high as in the first quarter, and third-quarter figures suggest further improvement.

Another important explanation for increased approvals in basic steel comes from the better sales volume realized in the third quarter of 1961.

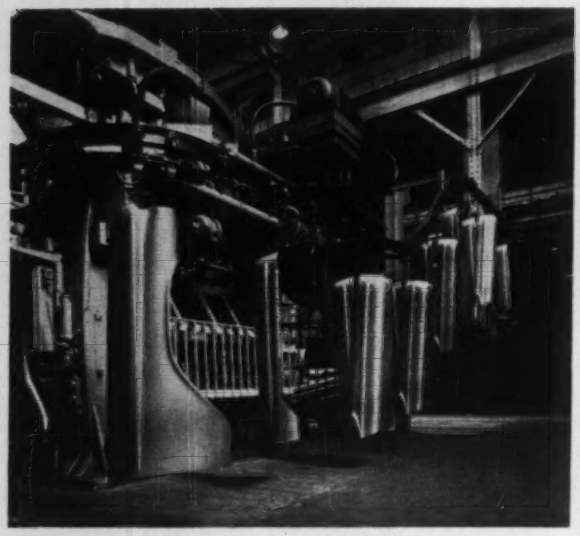
Seasonally adjusted value for iron and steel sales in the third quarter of 1961 were up 14 pct from a year earlier. They were also higher than in the second quarter of 1961.

Seasonally adjusted new orders for iron and steel in the third quarter of 1961 were an eighth higher

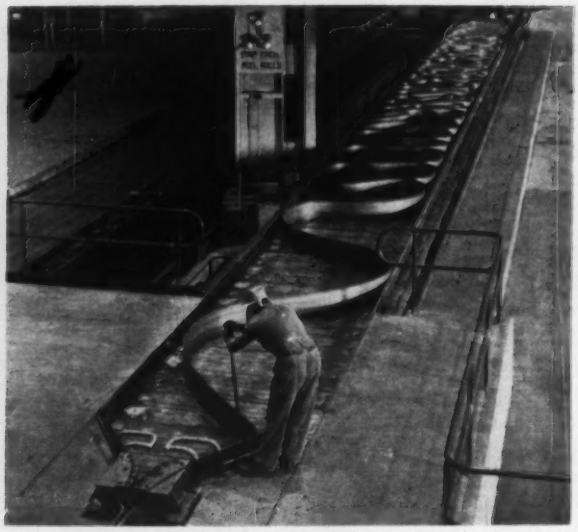
Gains Upset Seasonal Pattern

Pct Change: 2nd to 3rd Quarter

	1957	1958	1959	1960	1961	5-Year Average
Primary Metals	—60	—26	—46	—57	+92	—19
Fabricated Metal Products	—20	—11	—5	—20	+16	—8
Machinery (except elec.)	—63	—5	+17	+15	+4	—6
Electrical Mach. & Equip.	—25	—26	+26	—36	—18	—16
Transportation Equip.	—44	—10	—32	+27	—16	—15
Instruments, etc.	—5	+26	—45	+5	—18	—7
Total Metalworking	—53	—20	—26	—29	+19	—22



FABRICATED METALS: Producers report a 15 pct gain in new appropriations over third quarter '60.



PRIMARY METALS: Big increases by steelmakers raised third quarter appropriations sharply.

than in the previous quarter. The strengthening of demand has put a relatively greater volume of retained earnings at the call of capital expansion programs.

Nonferrous—In primary nonferrous metals, companies rolling, drawing and extruding nonferrous metals boosted appropriations in the third quarter. This is partly the result of a hike in net profits. Nonferrous foundries also increased their approvals.

However, the nonferrous smelters and miscellaneous primary metals registered substantial declines between the second and third quarters.

Fabricated Metals—New appropriations by makers of fabricated metal products have gone up from —20 pct in the second quarter to +15 pct in the third on a year-to-year basis, an advance of 35 points.

Every industry in the group except cutlery, hand tool, and hardware producers posted year-to-year improvements in the third quarter of 1961.

Nonelectrical Machinery—Third quarter 1961 appropriations by the nonelectrical machinery industry were at about the same level as a

continued on page 36

Overall Trend in Capital Spending Plans

Major Metalworking Groups

Industry	SIC Code	Capital Appropriations—$ Millions 1960 3rd Qtr.	1960 4th Qtr.	1961 1st Qtr.	1961 2nd Qtr.	1961 3rd Qtr.	Pct Change 3rd Qtr. 1961 over 3rd Qtr. 1960	Pct Change 1st 9 mos. 1961 over 1st 9 mos. 1960	Pct Change 3rd Qtr. 1961 over 2nd Qtr. 1961	Pct Change 5-yr. Avg. 3rd Qtr. over 2nd Qtr. (1961–1957)
Metal Furniture	25	$3.0	$2.2	$1.6	$1.2	$.8	−73 Pct	−64 Pct	−31 Pct	+ 6 Pct
Primary Metals	33	164.4	129.2	189.9	144.9	278.0	+69	−32	+92	−19
Fabricated Metal Products	34	35.2	50.3	32.6	35.1	40.5	+15	−22	+16	− 8
Machinery (ex. Electrical)	35	71.8	76.9	92.8	69.4	71.9	0	−13	+ 4	− 6
Electrical Mach. & Equip.	36	45.3	66.6	73.3	53.5	44.1	− 3	−16	−18	−16
Transportation Equipment	37	165.0	122.5	139.1	191.8	160.2	− 3	1	−16	−15
Instruments, etc.	38	14.1	8.2	17.2	10.8	8.9	−37	−18	−18	− 7
Total Reported[1]		498.7	455.9	546.5	506.7	604.4	+21	−19	+19	−22
Total Estimated for All Metalworking[2]		$679.6	$629.4	$749.8	$677.4	$787.3	+16 Pct	−19 Pct	+16 Pct	−20 Pct

Based upon returns from 485 companies reporting 721 separate industry groups.
[1] Excludes ordnance and accessories, SIC Code 19, and miscellaneous manufacturing, SIC Code 39.
[2] Estimated for entire metalworking universe. This includes metalworking firms operating at least one plant employing 500 or more production workers in 1957. See coverage table, page 38.
Source: The National Industrial Conference Board.

Primary Metal Industries

Industry	SIC Code	Capital Appropriations—$ Millions 1960 3rd Qtr.	1960 4th Qtr.	1961 1st Qtr.	1961 2nd Qtr.	1961 3rd Qtr.	Pct Change 3rd Qtr. 1961 over 3rd Qtr. 1960	Pct Change 3rd Qtr. 1961 over 2nd Qtr. 1961	Pct Change 5-yr. Avg. 3rd Qtr. over 2nd Qtr. (1961–1957)
Blast Furnaces, Steel Wks. & Rolling Mills	331	$100.1	$94.1	$149.8	$98.5	$222.6	+122 Pct	+126 Pct	−14 Pct
Iron & Steel Foundries	332	17.4	1.7	13.4	9.4	7.0	−60	−25	− 5
Primary Smelt. Nonferrous Metals[1]	333–334	19.2	11.1	13.1	8.4	−3.7	n.c.	n.c.	−45
Rolling, Drawing, Extruding Nonferrous	335	24.1	19.1	11.5	24.9	48.9	+103	+96	−11
Nonferrous Foundries	336	1.1	1.3	.2	1.3	1.9	+73	+52	+34
Misc. Primary Metals	339	2.4	1.8	1.9	2.4	1.2	−49	−48	+13
Total	33	$164.4	$129.2	$189.9	$144.9	$278.0	+69 Pct	+92 Pct	−19 Pct

[1] Includes secondary nonferrous smelters, SIC 334. n.c. = not computed.

Fabricated Metal Products

Industry	SIC Code	Capital Appropriations—$ Millions 1960 3rd Qtr.	1960 4th Qtr.	1961 1st Qtr.	1961 2nd Qtr.	1961 3rd Qtr.	Pct Change 3rd Qtr. 1961 over 3rd Qtr. 1960	Pct Change 3rd Qtr. 1961 over 2nd Qtr. 1961	Pct Change 5-yr. Avg. 3rd Qtr. over 2nd Qtr. (1961–1957)
Metal Cans	341	$6.2	$22.1	$6.8	$5.7	$8.8	+41 Pct	+54 Pct	+ 6 Pct
Cutlery, Tools, Hardware	342	8.8	5.0	4.9	5.2	9.2	+ 5	+77	+196
Heating Apparatus (ex. Elec.) & Plumbing Fixtures	343	3.5	4.0	3.6	1.3	2.5	−30	+95	+ 4
Fabricated Struct. Products	344	8.0	10.6	6.7	16.4	12.0	+49	−27	−46
Screw Products & Rivets	345	.9	1.2	1.1	1.7	1.8	+107	+ 9	+10
Stampings	346	3.6	4.7	4.3	2.1	2.0	−44	0	+19
Coating, Engraving; Misc. Fabr. Wire Prod.	347–348	.4	.3	.8	.6	1.9	+388	+196	+21
Miscellaneous Fabricated Metal Products	349	3.8	2.3	4.5	2.1	2.3	−38	+10	−16
Total	34	$35.2	$50.3	$32.6	$35.1	$40.5	+15 Pct	+16 Pct	− 8 Pct

Transportation Equipment

Industry	SIC Code	Capital Appropriations—$ Millions 1960 3rd Qtr.	1960 4th Qtr.	1961 1st Qtr.	1961 2nd Qtr.	1961 3rd Qtr.	Pct Change 3rd Qtr. 1961 over 3rd Qtr. 1960	Pct Change 3rd Qtr. 1961 over 2nd Qtr. 1961	Pct Change 5-yr. Avg. 3rd Qtr. over 2nd Qtr. (1961–1957)
Motor Vehicles & Equip.[1]	371, 375, 379	$129.5	$62.6	$86.3	$141.0	$85.2	−34 Pct	−40 Pct	−17 Pct
Aircraft & Parts	372	28.2	53.9	41.3	46.8	60.1	+113	+28	− 4
Ship & Boat Building	373	6.5	4.1	10.4	3.1	13.8	+111	+343	+37
Railroad Equipment	374	.8	1.9	1.2	1.0	1.1	+41	+17	+ 6
Total	37	$165.0	$122.5	$139.1	$191.8	$160.2	− 3 Pct	−16 Pct	−15 Pct

[1] Includes motorcycles, bicycles and parts, and miscellaneous transportation equipment.

Electrical Machinery

Industry	SIC Code	Capital Appropriations—$ Millions 1960 3rd Qtr.	1960 4th Qtr.	1961 1st Qtr.	1961 2nd Qtr.	1961 3rd Qtr.	Pct Change 3rd Qtr. 1961 over 3rd Qtr. 1960	Pct Change 3rd Qtr. 1961 over 2nd Qtr. 1961	Pct Change 5-yr. Avg. 3rd Qtr. over 2nd Qtr. (1961–1957)
Elec. Transmission Equip.	361	$4.6	$15.3	$4.1	$7.2	$2.7	−42 Pct	−63 Pct	+22 Pct
Elec. Indus. Apparatus	362	11.9	5.8	7.5	6.5	7.5	−37	+15	−17
Household Appliances	363	2.7	9.1	5.6	4.7	4.8	+79	+ 1	−13
Electric Lighting & Wiring Equipment	364	3.2	6.5	8.2	12.7	1.1	−65	−91	−58
Radio & TV Receivers	365	3.4	3.5	.6	2.2	1.3	−62	−40	+ 1
Communication Equipment	366	9.7	12.5	19.6	5.9	10.6	+ 9	+78	+71
Electronic Components	367	9.4	13.7	27.2	13.5	15.6	+65	+15	−17
Misc. Electrical Equipment	369	.4	.2	.5	.8	.6	+56	−26	−12
Total	36	$45.3	$66.6	$73.3	$53.5	$44.1	− 3 Pct	−18 Pct	−16 Pct

Nonelectrical Machinery

Industry	SIC Code	Capital Appropriations—$ Millions 1960 3rd Qtr.	1960 4th Qtr.	1961 1st Qtr.	1961 2nd Qtr.	1961 3rd Qtr.	Pct Change 3rd Qtr. 1961 over 3rd Qtr. 1960	Pct Change 3rd Qtr. 1961 over 2nd Qtr. 1961	Pct Change 5-yr. Avg. 3rd Qtr. over 2nd Qtr. (1961–1957)
Engines & Turbines	351	$5.2	$8.0	$7.1	$5.8	$2.4	−53 Pct	−58 Pct	+ 2 Pct
Farm Machinery & Tractors	352	7.2	9.6	15.0	7.7	17.5	+142	+126	+38
Construction, Mining, Handling Equipment	353	3.9	10.8	4.3	8.6	5.0	+29	−42	−41
Metalworking Machinery & Equipment[1]	354, 359	6.3	5.7	11.6	6.5	7.0	+10	+ 7	+10
Special Indus. Machinery	355	7.0	9.0	8.8	10.4	11.3	+61	+ 9	−12
General Ind. Machinery & Equipment	356	8.2	10.3	19.3	6.6	6.5	−21	− 1	+26
Office & Store Machines	357	27.1	18.5	25.6	22.7	21.2	−22	− 7	+ 4
Service Industry Machines	358	6.8	5.0	1.0	1.1	1.0	−85	− 6	− 1
Total	35	$71.8	$76.9	$92.8	$69.4	$71.9	0 Pct	+ 4 Pct	− 6 Pct

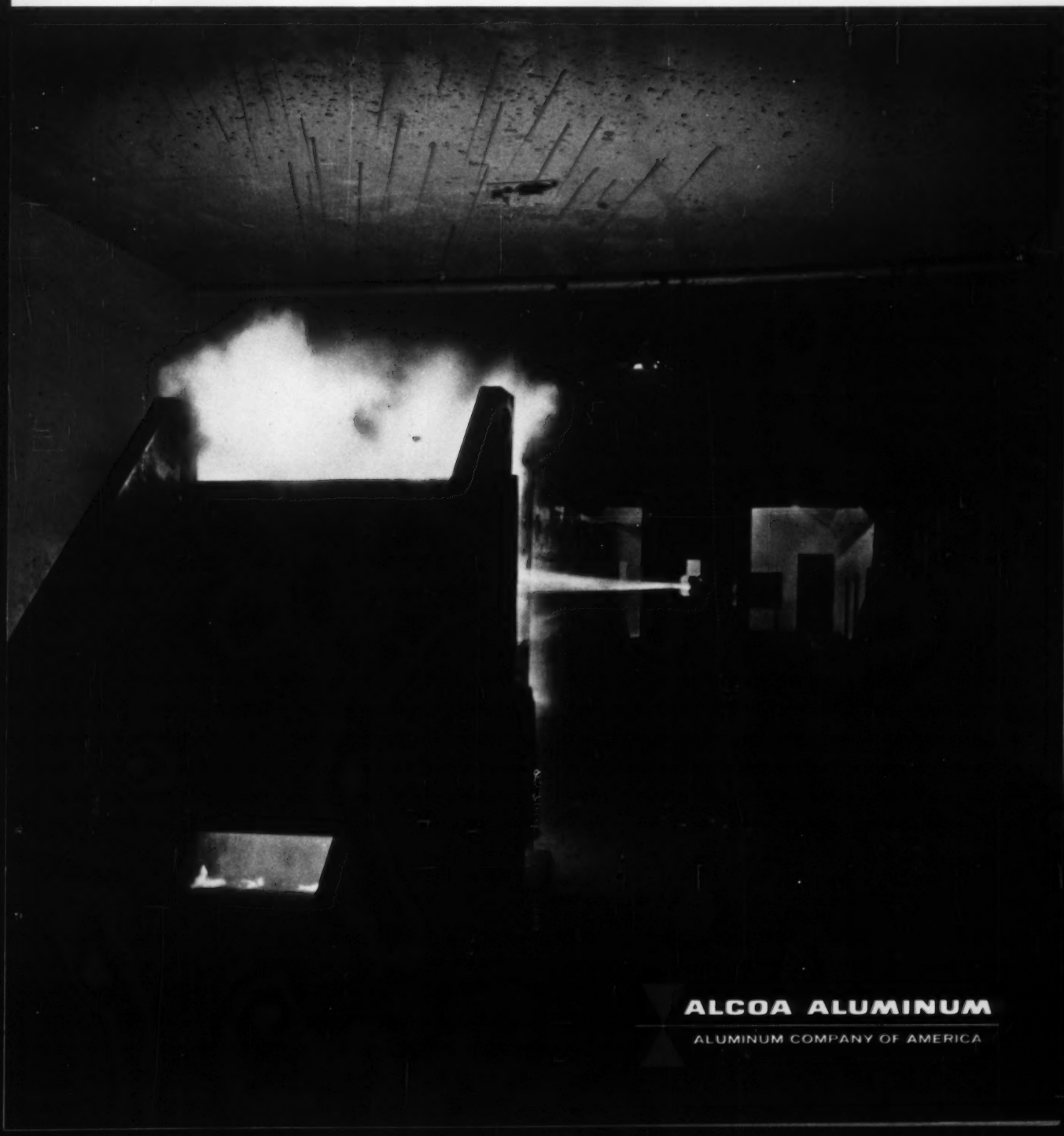
[1] Includes miscellaneous, nonelectrical machinery, SIC Code 359.

Instruments

Industry	SIC Code	Capital Appropriations—$ Millions 1960 3rd Qtr.	1960 4th Qtr.	1961 1st Qtr.	1961 2nd Qtr.	1961 3rd Qtr.	Pct Change 3rd Qtr. 1961 over 3rd Qtr. 1960	Pct Change 3rd Qtr. 1961 over 2nd Qtr. 1961	Pct Change 5-yr. Avg. 3rd Qtr. over 2nd Qtr. (1961–1957)
Laboratory, Scientific & Engineering Instruments	381	$4.9	$2.7	$7.8	$5.5	$3.1	−36 Pct	−43 Pct	−18 Pct
Measuring & Controlling Instruments	382	3.5	3.0	5.2	3.3	3.4	− 2	+ 3	− 3
Other[1]	383, 4, 5, 6, 7	5.7	2.6	4.1	2.0	2.3	−59	+15	+15
Total	38	$14.1	$8.2	$17.2	$10.8	$8.9	−37 Pct	−18 Pct	− 7 Pct

[1] Includes optical instruments, surgical instruments, ophthalmic goods, photographic equipment and watches, clock-operated devices, SIC Codes 383, 384, 385, 386, 387.

When an aluminum weld stops a 37mm high-explosive shell...



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ALUMINUM COMPANY OF AMERICA

When an aluminum weld stops a 37mm high-explosive shell . . . # *that's Alcoa Total Ability at work!*

Blam! A 37mm high-explosive shell slams home right into the weld. It holds, and weldable Alcoa® Aluminum Armor Plate passes its last test. Next stop: armored vehicles for our defense forces, giving personnel the protection of steel at a saving in weight . . . adding vital speed, range and air-borne mobility.

This 1¼-in. "H" plate of Alcoa Alloy 5083 is welded by the inert gas shielded method, using Alcoa 5356 consumable electrode. Aluminum is *field-weldable!* Portable gear goes along by jeep or mechanical mule, independent of power or cooling water.

Whatever the joining method for aluminum, you get more savvy (and the best materials) from Alcoa. It follows. Alcoa perfected most of them. Welding, brazing or soldering? Alcoa knows how to boost quality, hold down costs. For mechanical fastening Alcoa makes bolts, nuts, rivets, washers, screws and "specials" to your order. And they're made of the proper alloy, fully heat-treated to insure lasting strength.

Alcoa also supplies aluminum sheet and plate, extrusions, impacts and castings in all alloys, tempers and finishes. Stands to reason, then, we've no favorites among them. Your needs call the shots for *Alcoa Total Ability!* Find out more from the Alcoa sales office near you, or write: Aluminum Company of America, 855-Z Alcoa Building, Pittsburgh 19, Pa.

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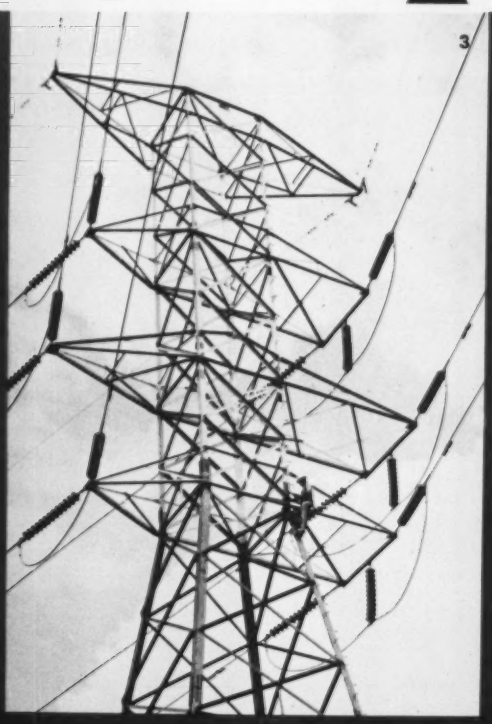

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2. Aluminum superstructure for the guided-missile destroyer *U.S.S. Dewey* uses Alcoa alloys welded by IG consumable-electrode method.

3. Alcoa Aluminum superstructure for electrical transmission tower is made of welded subassemblies, bolted together in the field.

4. Aluminum leisure furniture made of Alcoa welded tube keeps its smart good looks for years, fastened *right* with rustproof aluminum rivets, sheet metal screws.

5. All-aluminum electrical substation: Special wide-flange beams are bolted; main and line section buses and taps are welded tube.

6. All-aluminum personnel boat is Alcoa Alloy 5456. Welded *faster* than steel, it ends sandblasting, metalizing, stress-relieving.

Alcoa Almigweld Electrode stays cleanest for soundest welds!

Unique "Missile Pak" keeps Alcoa * Almigweld Electrode clinically clean! In defense plant (where it's vital) or job shop (where it's profitable), you get good, sound welding . . . higher output with fewer rejects using Almigweld Electrode in "Missile Pak"—another Alcoa *first*.

Form-fit polystyrene case comes hermetically sealed against dirt and moisture, with desiccant for insurance. It protects Almigweld Electrode from contamination; guards reel against handling damage. New *plastic* spool, dustless and moistureproof, holds 12½ lb for 25 per cent *more* welding between changes.

Alcoa Almigweld Electrode is layer-level wound to pay off smoother, easier.

For more information on this special "Missile Pak," call your local Alcoa sales office. Contact your local Alcoa distributor or jobber for aluminum welding materials.

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Survey Coverage of Plant Workers*

All companies in the industries listed below, with plants of 500 or more plant workers were queried. They account for about two-thirds of the total employment and buying power in the metal working industry. The fourth column shows the percentage of production workers employed by the companies cooperating in this survey. The last column shows appropriations per production worker.

Industry and SIC Code	Production Workers, Thousands	Production Workers, Thousands	Pct of Total Employment	Appropriations per Production Worker,[1] $
	Companies With Plants of 500 or more	Cooperating Companies	Cooperating Companies	
Metal Furniture, 251, 252, 253, 254, 259	31	13	43 Pct	$ 433
Blast Furnaces, Steel Works, Rolling Mills, 331	595	547	92	1,033
Iron and Steel Foundries, 332	81	63	78	500
Primary & Secondary Smelting, Nonferrous, 333, 334	54	50	93	577
Rolling, Drawing, Extruding, Nonferrous Metals, 335	114	80	71	1,298
Nonferrous Foundries, 336	19	13	67	373
Misc. Primary Metals, 339	37	22	59	331
Metal Cans, 341	47	45	95	972
Cutlery, Hand Tools, Hardware, 342	54	35	65	684
Heating Apparatus (except elec.) & Plumb. Fixtures, 343	34	21	61	540
Fabricated Struct. Prods., 344	60	45	75	1,012
Screw Prods. & Rivets, 345	26	15	60	382
Stampings, 346	65	43	67	303
Coating, Engraving; Miscellaneous Fabricated Wire Products, 347, 348	21	10	47	372
Mis. Fab. Metal Prods., 349	54	37	68	306
Engines & Turbines, 351	71	58	82	400
Farm Mach. & Tractors, 352	60	34	56	1,468
Construction, Mining Handling Equipment, 353	111	79	71	362
Metalworking Machinery & Equipment, 354, 359	105	64	61	481
Special Industry Mach., 355	47	22	48	1,764
General Industrial Machinery & Equipment, 356	92	62	67	688
Office & Store Machines, 357	78	58	74	1,528
Service Ind. Machines, 358	38	22	59	360
Elec. Trans. Equip., 361	90	49	54	601
Elec. Ind. Apparatus, 362	134	65	48	423
Household Appliances, 363	96	46	48	522
Electric Lighting & Wiring Equipment, 364	55	30	54	957
Radio & TV Receivers, 365	71	27	38	280
Communication Equip., 366	113	52	46	943
Electronic Components, 367	95	62	65	1,129
Misc. Elec. Equipment, 369	27	8	29	282
Motor Vehicles & Equip., 371, 375, 379	648	558	86	672
Aircraft & Parts, 372	522	481	92	420
Ship & Boat Building, 373	61	47	77	666
Railroad Equipment, 374	43	26	61	199
Laboratory, Scientific & Eng. Instruments, 381	41	16	39	1,204
Measuring & Controlling Instruments, 382	41	26	64	572
Other, 383, 384, 385, 386, 387	77	20	26	724
Total	4,007	2,952	74 Pct	$716

* Based upon returns from 485 Companies reporting 721 individual industry codes. Employment figures based on Iron Age Census data, 1957. Figures in last column calculated from unrounded data. Over 1,200 plants with 500 or more production workers reported.

[1] In dollars per production worker, based on appropriations made fourth quarter 1960 through third quarter 1961 and plant employment of reporting companies in 1957.

SOURCE: The National Industrial Conference Board.

Continued from p. 32

year earlier.

The engine and turbine, metalworking equipment, general industrial machinery, office and computing machine and service industry machine groups posted year-to-year declines.

However, the farm machinery and special industrial machinery advanced, while appropriations in the construction, mining and material-handling equipment industry climbed at the same pace as in the second quarter.

Electrical Machinery—Electrical machinery and equipment makers reduced their year-to-year rate of appropriations declines to 3 pct in the third quarter of 1961 from a 25 pct decline in the second quarter of 1961.

The clearest year-to-year increases occurred in household appliances, electronic components and miscellaneous electrical equipment.

Transportation Equipment—For the third quarter of 1961, transportation equipment manufacturers reduced appropriations moderately below their levels in the third quarter 1960.

However, for the first nine months of 1961 transportation equipment appropriated about 1 pct more than in the same period of 1960.

Aircraft and parts producers appropriated slightly less in the third quarter of 1961 than in the second quarter, while the ship and boat building and railroad equipment groups posted considerable advances.

Instruments—The capital appropriations of the instrument manufacturing industries fell in the third quarter of 1961.

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New Sports Models on the Way

Ford, Chevrolet, and Plymouth Have Plans for 1962

The Big Three haven't finished introducing new models. Rumors abound in Detroit of more to come.

Accent will be on sports-type models. Changes in basic marketing philosophy may come.

By A. E. Fleming

▪ The 1962 model year is three months old. But the new model bug is still biting automotive idea men.

As the new year approaches, there are several new cars that are scheduled to appear quite soon as late arrival 1962's. Some of these are eleventh-hour ideas, others have been in the planning stages for a long while.

Corvair Convertible—A Corvair convertible will bow around March. When the Corvair first came out a couple years ago, Chevrolet strategists were dead-set against a compact softtop, indicating it was nothing short of blasphemy to insert such an expensive and low-volume body style as a convertible in an economy (compact) lineup.

Things have changed. It is established that people will pay top dollar for a sharp, dolled-up compact. With Chevrolet's Monza, the luxury Corvair, selling well, and with a convertible around the corner, rumors are beginning to pop that Chevrolet will make the Corvair line a special sport-type series, and let the new Chevy II satisfy the wants and needs of those interested in "basic transportation."

Ford Moves, Too—Also expected to debut before spring is a spruced up Ford Galaxie, designated the 500XL. This will be one of those popular bucket seat jobs. But from Ford sources, there is indication that the 500XL is not just another model. Inference is that it will become an entire new series of Fords, that the current top of the line Galaxie series may be downgraded, perhaps become part of the Fairlane family.

At any rate, 500XL will be introduced in two styles, as a two-door hardtop and a convertible.

Plymouth's Plans — On the designing board at Plymouth for some time has been a sport Fury model, also a bucket seater with all the other fancy extras that will go with it. This will be marketed in the near future, also as a two-door hardtop and convertible.

Then there is the Cardinal, the most widely publicized car to come along in years, although there has been nothing in the way of official recognition of the car by Ford Motor Co., its ultimate manufacturer.

But now there is news that the V-4 Cardinal is coming. Word is there will be a press conference soon, probably in January, at which the existence of such a model will be acknowledged by Ford officials. Best information to date is that the Cardinal will go on sale September as a 1963 model.

SOME OF 600,000: Auto lines across the country are working at near-capacity as demand for new cars pick up. These blocks for Chevrolets, automatically machine-finished here preparatory to assembly, are part of the 600,000 cars scheduled for assembly this month.

Production Up in Bull Market

Capacity Operation Expected During First Half

Steel spokesmen on the West Coast were asked to outline their plans for 1962.

Their answers show optimism based on several factors. But some problems are evident.

By R. R. Kay

■ How will the steel industry do in the next year? The Iron Age asked some of the top men in the steel industry on the West Coast. Here's their thinking and planning:

Surging steel production will put new zip into the economy. You can look for the 13 Farwestern states to consume 7.2 million tons. That's about one-half million tons more than in 1961, and it's pretty near the 1956 and 1957 peak.

Inside View—Why so bullish?

The big push in steel consumption will be in construction and contractors' products. Steelmakers expect to see new record use in this field.

Home and apartment starts should be up 10 pct; and industrial building a huge steel user, up a fat 25 pct. New steel uses in highway construction will help make new records.

The Buildup—There was very little inventory building in 1961. Most of the Farwestern buyers, except Californians, will start filling up their shelves right after the first of the year. The buildup will get off to a slow start in the first quarter. But it should gain steam in the second quarter.

California's inventory tax date is March 1. Right after that, the industry looks for a flood of orders and they will be healthy ones, too. The state eats up 75 pct of the steel sold in the Farwest.

First Half — Many steelmakers predict they'll be operating at capacity. At least for the first six months.

Canmakers should have a good year. When the nation's economy is in good shape, it brings a healthy price level and adds stimulus to pack needs. Look for thin tinplate to make its impact felt on oil cans and the citrus pack next year.

Some 600,000 to 650,000 tons of imported steel will come into the region. That's about nine pct of the total market.

The international market for steel is soft. If the condition continues it means more competition from foreign producers.

Machining Rings for a Missile

AT SAN DIEGO: A big turret lathe at Ryan Aeronautical Co., machines separation rings for the Minuteman ICBM.

How Ford Engineers Processes

Manufacturing Engineers Take Part in Product Design

Ford engineering executive analyzes how mass production processes are engineered.

Manufacturing engineers must be called in in early stages of product design.

By R. H. Eshelman

■ In the good old days of the Bull-of-the-Woods foreman, feuds between shop and front-office engineers were classic.

Today, of course, mass production processes are engineered for optimum efficiency. They've become too complex and precise to continue as a shopman's heavy-handed art. Even the old-style calipers inspectors have given way to quality control engineers.

How It's Done at Ford—Pointing to vastly improved reliability and life of present automotive products, Robert E. Davis, manufacturing engineering manager of Ford Motor Co.'s engine and foundry division, recently analyzed why.

He took a section meeting of Society of Automotive Engineers behind the scenes in the relatively new but zooming field of manufacturing engineering. In contrast to old-style shop-office feuds, this work depends on close working relationship between product design engineers, quality control and manufacturing engineers.

"In the past," he suggested, "too little time and effort were spent discussing not only product function, but also manufacturing feasibility." Now, he notes, the manufacturing engineer discusses product design in the initial design stages. He suggests modifications specifically to improve manufacturing.

ENGINEERED MANUFACTURING: Operator checks 32 critical dimensions of crankshaft on automatic gage at Ford Lima, O., plant. Crankshafts are also checked at machining operations in addition to final check.

Differences Settled Early—At the same time, of course, the product engineer lays his cards on the table. He frankly states major functional characteristics required by the part. Then, if there are differences, the two groups of engineers get together to discuss product design vs. manufacturing feasibility. This is still during planning stages. It's all a lot different from the old shop approach—an engineering science.

Further, close cooperation and teamwork during planning and design phase follows on with an extensive manufacturing quality control system. More engineers are at the helm. In a word, the engineers are in charge today from design until the end product rolls out the door.

Here are some examples cited by Mr. Davis from Ford machining and assembly lines:

Examples—For instance, they've devised new methods of clamping and holding exhaust manifolds during transfer machining to eliminate pallet fixtures. They found rough castings developed stresses and strains with the previous method.

Mr. Davis revealed other advances in use of throw-away insert cutting tools, in machining 'slipper-type' pistons and in assembly operations. Each case illustrated how careful and detailed engineering in shop production takes over to improve the product, cut costs, speed production.

No item or trouble spot is too small for careful production engineering consideration. And the search for efficiency never ends.

MEN IN METALWORKING

D. C. McCarthy, elected president, Pratt & Whitney Co., Inc.

B. N. Dagan, elected vice president, operations, Kaiser Steel Corp.

G. E. Balsley, elected vice president, industrial relations, Kaiser Steel Corp.

Studebaker International—A. R. Gale, appointed president.

National Federation of Independent Scrap Yard Dealers Inc.—Nathan Willis, reelected president; Daniel Weinstein and Stanley Diefenthal, elected vice presidents.

Ohio Nut & Bolt Co. — R. J. Whelan, elected president.

A. M. Byers Co.—A. S. Chalfant, elected president.

Illinois Manufacturers' Assn.—L. C. Ferguson, elected president.

Power Crane & Shovel Assn.—A. F. Busick, Jr., elected president.

Plumbing Brass Institute—C. W. Rush, Jr., elected president; N. A. Lougee, elected vice president.

Westinghouse Electric Corp.—E. V. Huggins, named executive vice president, associated activities; G. L. Wilcox, named vice president and deputy to executive vice president.

Bendix Corp. — A. C. Omberg, elected vice president.

Northrop Corp.—George Douglas, elected corporate vice president and general manager, Radioplane Div.

Reflectal Corp.—Gilbert Smith, elected vice president, sales.

Pittsburgh Plate Glass Co.—M. W. Marshall, elected vice president, automotive sales, Glass Div.

North American Van Lines—T. L. Yates, named asst. to vice president, sales.

General Magnaplate Corp.— Dr. P. J. Brodeur, appointed vice president, Special Coatings Div.

Bonney-Floyd Co.—S. E. Mueller, elected vice president, sales; T. J. Ohls, elected vice president, operations.

W. J. Stephens, elected executive vice president, Jones & Laughlin Steel Corp.

Mack Trucks, Inc.—J. I. Andreini, named vice president, manufacturing; G. J. Dickey, named vice president, administration; A. R. Carpenter, named vice president and controller; R. W. Mullin, Jr., named executive asst. to the president.

Blaw-Knox Co. — B. M. Byers, named vice president.

Keystone Metal Co. — William Bausch, Henry Gross and John Keefe, named vice presidents.

Florida Drum Co., Inc.—W. J. Neville, elected vice president, sales.

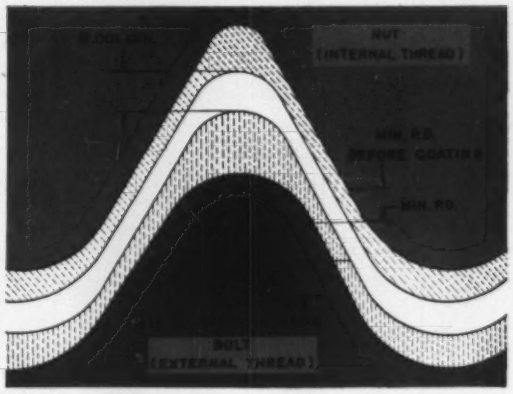
Martin Marietta Corp. — J. E. Muckley, elected vice president.

Link-Belt Co. — H. B. Collins, elected vice president.

D. C. Roscoe, appointed asst. vice president, sales, Bethlehem Steel Co.

Rolls Rounder Thread Forms

Tool engineers at Standard Pressed Steel Co. developed a specially-contoured thread to meet Space Age fastener demands. The fasteners need a protective coating. Since coatings usually build up at the top of the threads, they are rolled with a more generously rounded thread form. The result: Bolts are dimensionally uniform after the coatings are applied.



ROUNDED THREAD: Meets missile demands.

Larger Electronics Outlay

It now appears that electronics outlays by the Government for aircraft and missile equipment this fiscal year will total about $3.5 billion. This is roughly three times the amount spent for electronic communications equipment. Next year. electronics outlays for some areas of the rocket program are expected to at least double those of the '61 program.

Up-to-Date Refractories

NASA has boiled down a long list of refractory substances. Only three have emerged as victors for use in nose cones and supersonic aircraft, according to a recent report. They are: Silicon carbide-silicon; chromium-28 pct alumina cermet; and titanium boride-5 pct boron carbide.

New Re-Entry Problem

Developing space hardware to disintegrate in the atmosphere is a sticky business. Problem is especially critical with such items as nuclear reactors and other exotic high-energy systems. Look for world-wide opposition to their use should it appear that discarded space equipment proves potentially dangerous. Ideally, such hardware should vaporize harmlessly on re-entry into the upper atmosphere. Or, if this fails, hardware should land in a condition which poses no human hazard. Cloudburst tests are underway.

An Ear for Outer Space

As man advances farther into space, the problems of maintaining radio contact with earth becomes more complex. A bigger ear is needed. To meet the need, Lockheed designed a cosmic listening aid, said to be the largest in the world. The 85-ft diam hemispherical antenna remains stationary. Sounds are collected by a steerable antenna which is suspended from a boom just above the hemisphere. Look for a 1000-ft antenna soon.

Joining Vehicles in Space

One way to join space vehicles in orbit is to magnetize them. So say scientists at Norair Div., Northrop Corp. With additional power and electrical coils placed around their hulls, the vehicles could be attracted to each other during the critical docking and coupling maneuvers.

Air Force Wants Control

The Air Force, now controlling most of the U. S. military space program, is trying to move in on the civilian program. Top Air Force commanders seek more power in the manned spaceflight program. They want more emphasis put on manned spaceships for military use. Scientists at NASA believe scientific advances would suffer if the military butts in. The matter will be put before Congress sometime in 1962.

Registers Space Shots

A member of the Senate Space Committee is urging that Russia and the U. S. register space shots with the U. N. before launching. Sen. John C. Stennis said the proposal probably would be considered by the U. S. Committee on the Peaceful Uses of Outer Space. The Committee will meet in March to discuss cooperative space ventures. Stennis says the decision to discuss prelaunch registration of missile firings is a great step forward in our international relations.

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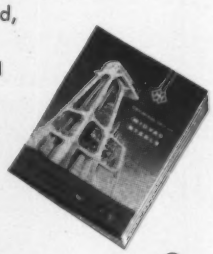
The Midvac Process eliminates atmospheric contamination, ingot soundness is improved, segregation is reduced, workability is increased and product quality is stepped up. Midvac Steels are offered in many alloys as billets or forgings to meet the most critical design specifications. Write for detailed metallurgical case history book to . . .



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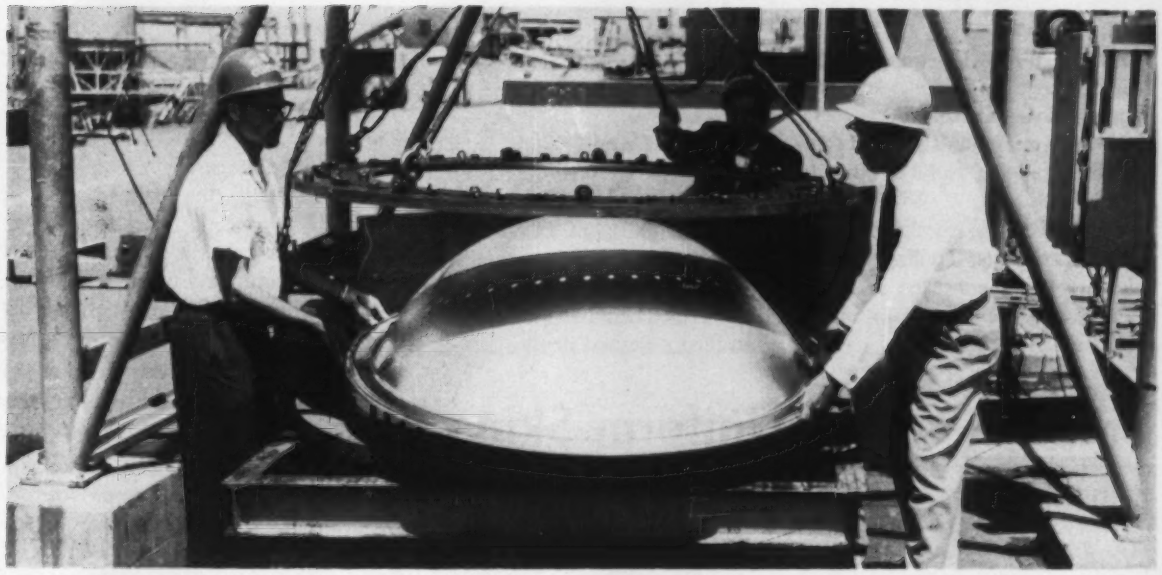


FINISHED BUBBLE: D. W. Kuhlman, (left), and Hank De Kleine, (right), lift a 5-ft diam part off the pressure chamber, as John Berg raises a restraining ring. Water pressure shaped part from a flat blank.

Water "Blows" Space Bulkheads

Low-Cost Forming Process Curbs Friction and Heat Problems

By **H. C. De Kleine**—Special Projects Engr., General Dynamics/Astronautics, San Diego

Various liquids and gases can be used in a new process to form huge, complex shapes.

Throughout a forming cycle, any temperature from –400° to 2700°F can be maintained.

■ Fluid pressure now serves as a sophisticated metalforming tool. A new process, known as decoction forming, yields remarkable results with simple, low-cost tooling.

Huge shapes — even king-size bubble buildings—may result from this new forming concept. Bulkheads of unlimited size for space vehicles are slated as one of the earliest applications.

Easy to Tool Up—In essence, tooling consists of a large boiler plate with a fluid fitting. A steel ring secures each preform or flat blank to this base plate. Then, water or another type of fluid feeds under the blank at pressures up to 350 psi.

The pressure of the fluid swells each blank into a hemispheric bubble. Skin-thickness variations are held within 0.001-0.004 in.

When the new process is used, friction and temperature-control problems disappear. These problems create major handicaps in most forming setups.

In decoction forming, the circulating fluid maintains intimate contact with the forming blank. Thus, the temperature of a part is easily controlled throughout the forming cycle.

Take Your Choice — Various fluids may serve as forming media. These include: Water, hot oils, molten metals, molten salts, and liquid or gaseous nitrogen. Other fluids fill specific needs.

Decoction forming is a developed process of the applied manufacturing research group, General Dynamics/Astronautics. It was conceived to eliminate the headaches encountered in forming large, thin parts of space-age materials.

Although under study for only a few months, the technique has already been tested with a variety of sheet metals and plastics. Results are noteworthy.

As our techniques develop, we'll expand testing from stainless steel and aluminum alloys to more exotic

materials. For most jobs, other fluids will replace water as the forming medium.

Hot or Cold—By using certain fluids, decoction forming even becomes a cryogenic-shaping process. Various forming fluids serve at temperatures ranging from —400° to 2700°F.

Let's check the results of some early experiments. Tooling used in this early work consisted of a 6-ft diam boiler plate with a 1-in. waterline fitting in the center.

A sheet-metal or plastic blank was placed on this boiler base plate. It was secured around its circumference by a heavy steel ring. The ring, in turn, was bolted tightly onto the base plate.

Bubble Grows—Water fed under each blank at pressures from 65-350 psi. As the water pressure built up, the blank began to swell. It took the shape of a hemispheric bubble. The water pressure was maintained until the formed part reached a desired depth.

Forming pressures are easy to calculate. Here's the formula:

$$P = \frac{4t\ S}{D}$$

Where:
P = fluid pressure, psi
D = largest diam of part, in.
t = thickness, in.
S = ultimate strength of blank, psi.

Normally, the formed skin is nearly equal in thickness at all points. It may vary by about 0.004 in. However, it can be held within 0.001 in. if the blank is chemically milled prior to forming. The first drawing shows a chem-milled blank in forming position.

Welded Preform — For large domes, welded segments serve as a preform. These segments form a truncated cone. They're butt welded on a straight-line welder; then they're rolled to a conical shape for the last weld.

Each cone's flange is seam or butt welded. Next, a preformed cap or a flat disk is butt welded onto the assembly. A section of a truncated cone with its form tool appears as the second drawing. All segments and the cap may be chem-milled before welding to control the formed-skin thickness.

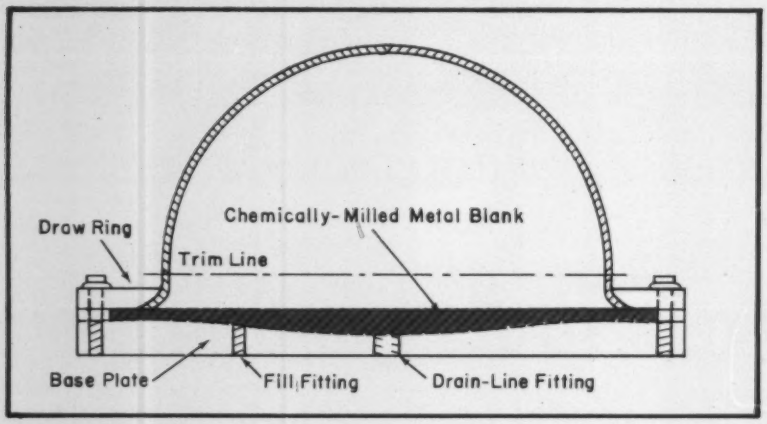
Tables list tensile-test data for aluminum and stainless-steel domes shaped by decoction forming. Tensile properties were determined at several points.

Samples were taken from the polar region of each dome. Other test samples came from the mid-sections between a pole and its flange. Skin-thickness readings appear in the last column of the large table.

Grain Structure—Microstructures of the aluminum domes, Type 3003 and Alclad 2024, show no measurable variations throughout the formed hemispheres. Uniform grain structures are present because interstage annealing was used during the forming process. Special efforts were also made to produce domes with uniform yielding.

Annealing insures recrystallization in the alloys. Any remaining "cold work" is put in following the last anneal.

Preform Yields Uniform Skin



Check Initial Test Data

Dome No.	Test Area	Yield Strength, psi	Tensile Strength, psi	Elongation, pct in 2 in.	Formed Thickness, in.
ALUMINUM, TYPE 3003*					
4	Pole	18,370	19,460	13	0.049
4	Side	18,530	19,750	12	0.045
18A	Pole	18,890	19,920	6	0.025
18A	Side	15,390	16,600	14	0.038
20A	Pole	17,730	19,560	10	0.051
20A	Side	17,490	18,950	17	0.053
ALUMINUM, ALCLAD 2024**					
2A	Pole	15,170	31,900	16	0.024
2A	Side	19,550	30,450	12	0.026
8A	Pole	19,850	30,500	14	0.032
8A	Side	19,880	30,120	12	0.034
19	Pole	15,700	31,440	15	0.024
19	Side	16,820	31,550	16	0.025
* Annealed 3003		7,440	16,300	37	—
** Annealed 2024		12,350	27,350	16	—

Thickness measurements prove that yielding in the domes was nearly uniform except in dome #18A. This difference in thickness is reflected in the dome's yield strength results at various positions.

It should be noted that the thickness of the polar material in dome #4 is greater than the mid-section thickness on the same dome. Why? Because this dome was formed from a chem-milled blank.

Cladding Is Intact—Cladding on the 2024 aluminum-alloy domes was checked metallographically after forming. It stayed intact in every case. This indicates the process can serve in shaping parts without damage to soft-clad surfaces.

Tensile properties of a single stainless-steel dome appear in a short table. These properties are compared with those of the material from which the dome was formed.

During forming, the yield strength of Type 304 stainless was raised. Changes in microstructure reflect this increased strength. A comparison of metal in the dome's top with the mill-annealed stock shows a slight distortion of the original equiaxed grain. Movement along slip planes also tends to crop up at this polar region.

Advantages—Decoction forming has several inherent advantages. It's a safe process. Thus, it can serve for in-plant operations where special operator skills aren't needed.

Decoction forming really pays off on large, thin parts similar to missile bulkheads. Tooling is simple. Mechanical properties of the formed parts often prove superior to those of parts formed by other processes.

Savings are substantial. We've computed potential savings on a part which is now being fabricated by conventional means. Here's the breakdown, based on manufacturing costs for 60 units.

Present tool-up time, including engineering and fabrication stages, is 49,206 hours. With decoction forming, this tooling time would tumble to only 12,736 hours.

The overall cost of 60 units is now $83,000 with present methods. Our expense figure should dip to $19,600 when decoction forming is used.

Cryogenic Forming — Limited decoction-forming tests at subzero temperatures with Type 301 annealed stainless show major increases in tensile properties.

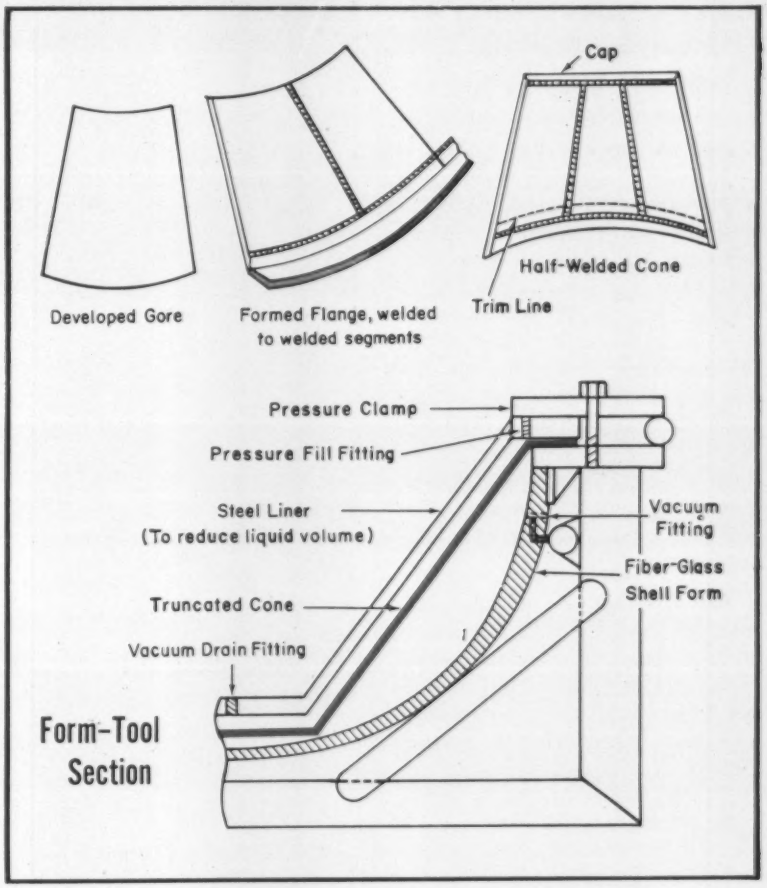
All experiments have been limited to hemispheric shapes. However, complex curved shapes can be formed if a lightweight "cavity" is placed over the blank to limit expansion during forming.

Stainless Strength Soars

STAINLESS STEEL, TYPE 304 ALLOY*

Dome No.	Test Area	Yield Strength, psi	Tensile Strength, psi	Elongation, pct in 2 in.
1A	Pole	97,340	117,290	28
1A	Side	87,630	112,110	34
* Annealed		36,580	86,940	58

Vacuum Draws Cone Into Shape



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Surplus Parts Plus Ingenuity Yield Flexible Machine Tool

By **H. A. Berry**—Tool-Engineering Mgr., Fabrication Div., Arde-Portland, Inc., Portland, Me.

Made from on-hand parts, a hybrid machine tool bores and finishes a complex spherical forging in only 35 minutes.

The same job used to take 3½ hours and tie up three separate pieces of machinery.

▪ A multipurpose machine tool—developed by engineers at the South Portland, Me., plant of Arde-Portland, Inc.—speeds production of vitally-needed rocket nozzles.

Tagged the spheromatic by its developers, the newcomer was put together from surplus parts. Total cost? Less than $3000. The hybrid machine earns its keep by finishing and boring a rocket-nozzle forging in only 35 minutes. This job used to take 3½ hours per forging.

Still Growing—As it stands, the machine consists of a heavy-duty milling head with a special carbide blade. Two rotary hydraulic motors drive this blade. Other components include a drilling unit with a rotary table and a grinding spindle.

In the not-too-distant future, Arde-Portland plans to add an ultrasonic unit which will feed coolant to the grinding wheel.

One of the company's products is a movable rocket nozzle for a major missile program. Fabrication of these nozzles involves, among other things, the finishing and boring of a spherical surface on an annealed 4130-steel forging.

The spherical surface of each forging measures about 12 in. in diameter. It's machined to almost a polished finish. The spherical radius must be within 0.001-in. TIR with respect to two trunnion-hole centers, bored 180° apart.

THREE IN ONE: Special unit combines shaping, finishing and drilling stages. It consists of a mill head, drill head and a grinding spindle.

Old Method — Previously, Arde-Portland used a conventional lathe with a tracer to rough machine these forgings. Then, a standard milling machine honed or polished each surface. Drilling of the trunnion holes took place in a boring machine.

These machining operations aren't difficult. However, the three separate operations consume a total of 3½ hours per forging.

To curb soaring costs, the company's tool engineers decided to make a thorough study of the problem. They spent several nights drawing circles. Then, in the words of one engineer, "We suddenly realized the obvious. A sphere can be considered an envelope of circles equidistant from a common center."

Here's a case in point. On the surface of a sphere that's equal to or greater than 4 in. in diameter, an infinite number of 4 in. circles can be scribed. If a tool cuts the peripheries of this series of circles in a solid mass, the end result is a sphere or spherical surface.

Another Conclusion — Also apparent was another important fact.

A ball with a diameter equal to or greater than a hollow cylinder's diameter can be rotated about its own axis—while it maintains contact with the cylinder's full circumference.

Why not substitute a fly cutter for the hollow cylinder? Then, let the workpiece replace the ball. By rotating each component about its own axis, it should be possible to obtain a spherical shape of uniform radius from the center.

The only limiting or controlling factors are the cutter's diameter and the distance from the center of a workpiece to the cutter's edge.

Using a horizontal milling machine, Arde-Portland's tool engineers tested their conclusions. In lieu of a fly cutter, they used an insert-blade milling cutter. This let them cut on the corner of the insert, rather than on the edge.

Wheel or Cutter? — Test results also indicated this approach should work just as well with a cup grinding wheel as with a cutter.

The next step was to put together a machine to use these concepts. With management's blessing and a $3000 budget, the engineers scoured the plant for surplus parts.

Their search netted an Avery drilling unit that was in good condition and had an excellent rotary table. They also uncovered a milling unit of unknown vintage.

A pair of hydraulic motors, with an infinite speed range and no noticeable change in power, wrapped up their fruitful search. The purchase of a low-cost Dumore grinding spindle filled out their requirements.

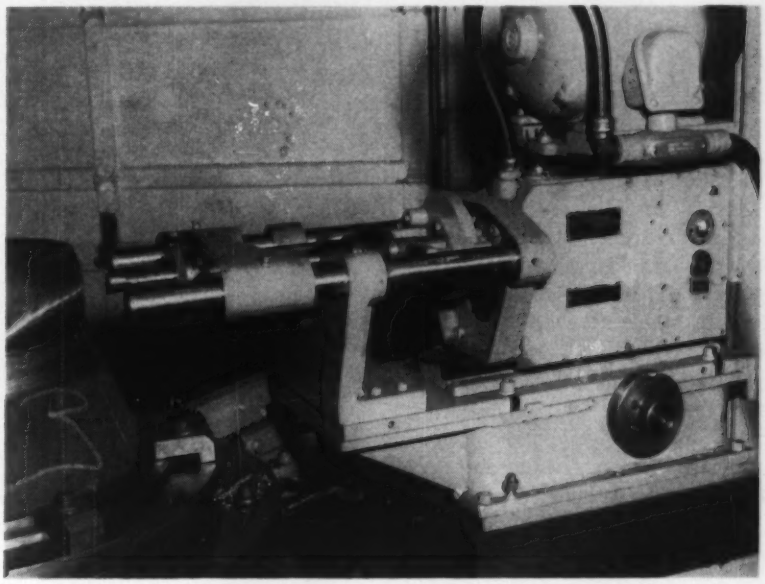
All these units were tied together in one hybrid machine. Actually, initial plans didn't include the boring operation. It was decided to include boring because the drill head was found in very good condition.

Roughing Stage—Driven by two hydraulic motors, the heavy-duty milling head roughs each spherical shape to within 0.015 in. of the finish diameter. This operation takes only five minutes.

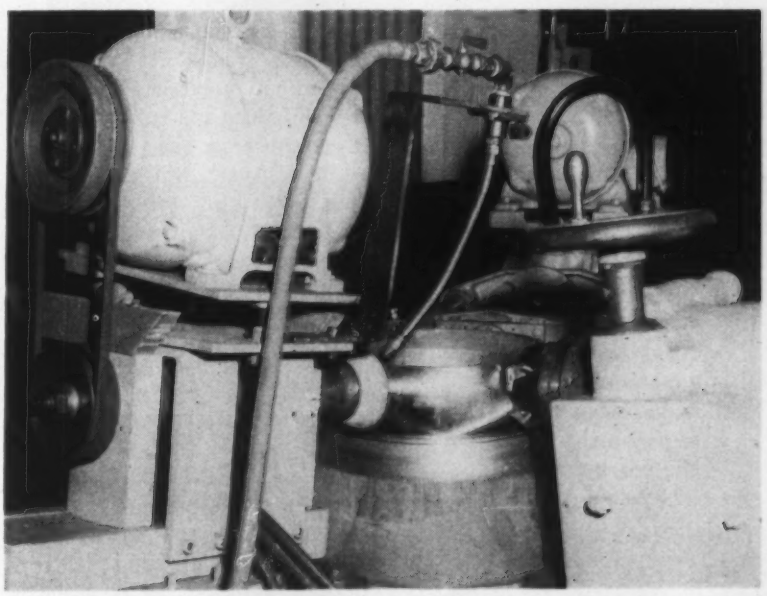
The grinding spindle then machines each surface to a 12 microinch finish. This step takes about 15 minutes. Drilling of the two blind trunnion holes consumes another 15 minutes.

The next step in the evolution of the spheromatic will be the addition of an ultrasonic unit that will apply coolant to the grinding wheel. This will allow the use of a harder, fine-grained wheel. When this stage is completed, even finer finishes will result.

Admittedly, the spheromatic isn't a streamlined beauty. It won't take a design prize. But it does show what can be done with surplus parts and a little ingenuity.



READY TO DRILL: The drill head bores two blind trunnion holes, located 180° apart, in the spherical surface of each rocket-nozzle housing.



OTHER OPERATIONS: Grinding and milling heads are incorporated in the multipurpose machine. It takes only 35 minutes to machine each forging.

New Metalforming Techniques Brighten Future Designs

Designers are watching the developments in both magnetic and electrical metalforming.

These methods are equipped to perform many of the unusual and more difficult jobs.

By **R. H. Eshelman**
Machinery Editor

■ New metalforming processes are coming, and their common denominator is the use of electrical energy. Three significant concepts will be discussed at the January SAE Congress in Detroit. All hold promise for the future of metalworking. They are magnetic-pulse forming, magnetic hammer forming and electro-hydraulic forming.

High-intensity pulsed magnetic fields show great potential for forming metal to useful shapes, according to D. F. Brower of General Atomic Div., General Dynamics Corp., San Diego. In fact a magnetic-pulse forming machine is already at work in a number of plants, he reveals.

SWAGING ALUMINUM: General Atomic's Magneform machine can be used to swage aluminum tubing to Tee fittings for scaffolding.

Work in controlled thermonuclear reactions and recent advances in energy storage capacitors, as well as high current switching devices, made the process possible. The set-up features a capacitor bank that holds up to 4500 foot-pounds of energy.

Fast Charge—Capacitors charge in two seconds, then discharge automatically through a magnetic coil to form the work. This magnetic pulse former is a simple tool with no moving parts. It is especially suited to such operations as expansion of the centers of long tubes.

Contact with workpiece is solely through the medium of the magnetic field. Thus it's possible to work through an insulating sheath, or even through the wall of a vacuum chamber.

For instance, metals such as molybdenum or tungsten can be flash heated under an insulating sheath, formed and rapidly cooled without heating the work coil unduly. This type forming is a considerably slower strain rate process than explosive forming. The technique can handle many forming operations where conventional methods fail.

Versatile Metalforming—Experimenters have tried many metalforming operations. They have swaged, sized, coined, and otherwise formed tubes and sheets of aluminum, brass, copper, steel, molybdenum and other metals.

They find workpieces with an electrical conductivity less than 10 pct of copper can be plated with copper, or formed by using a driver

Technical Highlights Of SAE Week

Other subjects to be discussed at the SAE Automotive Engineering Congress and Exposition in Cobo Hall, Detroit, Jan. 8-12, include:

- **Exotic Powerplants**
- **Reliability Workshop**
- **Technical Management**
- **Supersonic Aircraft**
- **Engineering Testings**
- **Cryogenics**
- **Engineering Education**
- **Ultrasonics**

Exposition hours: Monday and Wednesday, 11 a.m. to 6 p.m.; Tuesday and Thursday, 11 a.m. to 9 p.m.; Friday, 9 a.m. to 2 p.m.

sheet of light gage aluminum.

Another electrical forming technique utilizes a magnetic hammer. It consists of a conducting ring into which a current pulse is fed. When the hammer is held near a metal surface, the magnetic field of the ring is compressed, then pushes against the surface.

Ring-Shaped Hammer—A practical unit developed by Advanced Kinetics, Inc., is described in design detail by H. P. Furth and R. W. Waniek. They report the ring-shaped hammer quite useful for forming bowl shaped depressions. Applied magnetic pressure, however, is large only over the area covered by the actual ring.

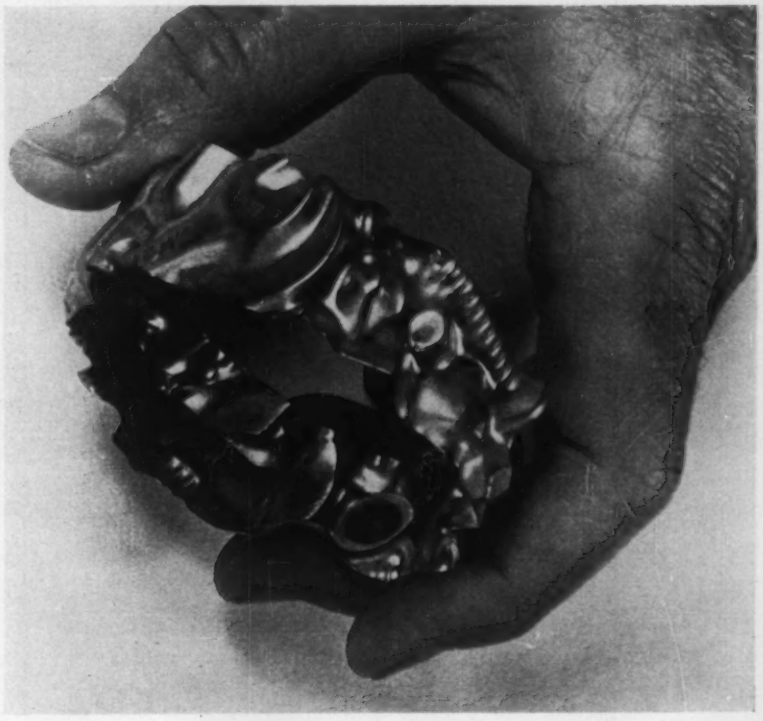
Direct contact electrodes with flexible extensions afford another interesting possibility. With this technique you can achieve uniform pressure over a large area. Energy requirements are low. Forming corrugations in large sheets is one of the suggested applications.

Also utilizing a pressure pulse is electro-hydraulic forming. This, however, depends on a complex series of chemical, electrical and mechanical reactions. According to Robert Felts of Electro Dynamics, Inc., this forming operation takes place in less than 400 microseconds.

Pressure Pulse—For the setup a capacitor of adequate size is charged up to 10,000 volts. This stored energy is quickly switched to a submerged spark plug, generating a high magnitude pressure pulse.

Some of the advantages reported for this type operation, then, apply equally to magnetic forming. Included are tool savings of about 40 pct, since a full set of matched dies isn't needed. Also, materials such as reinforced concrete, epoxy and phenolic resins, low melting alloys, are more practically handled than in press forming.

As for other advantages, capital investment to fabricate by these means appears much less than conventional equipment. There's also the promise of forming shapes not possible with slower processes due to the high rate of deformation.

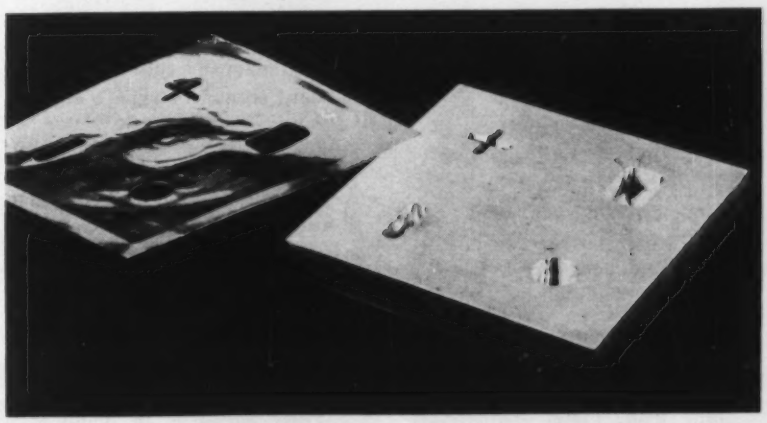


PROOF OF DETAIL: High degree of excellence of magnetic pulse process is shown as ring is compressed over assortment of hardware.

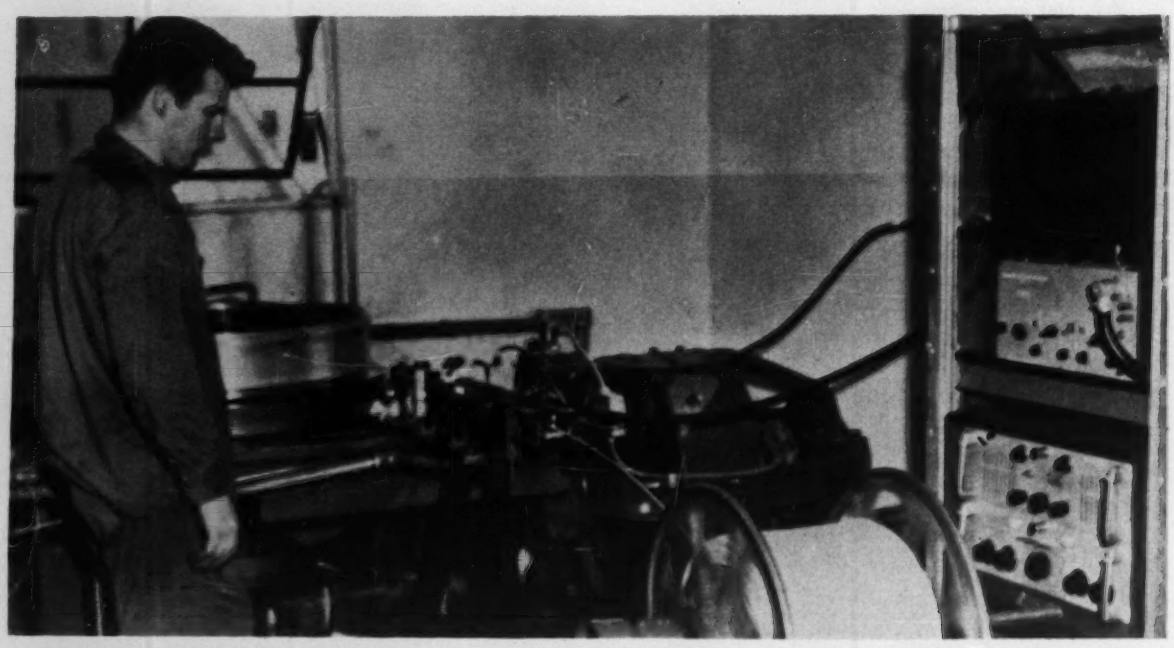
Commercial Steel—In some instances, electro hyd aulics has formed commercial cold-rolled steel as readily as premium drawing quality steel. As noted, the short cycle time affords a high production rate of potential—the high energy capacitor charges and discharges well over 100 cycles per second.

Of course there are limitations, too. Availability of suitable shop-type components is one problem. Another is lack of shop experience with handling electricity in such kilovolt ranges. The question of personal safety is sure to crop up.

Obviously, these processes cannot do everything. Their great value lies in a new degree of design and manufacturing freedom.



MAGNETIC HAMMER: In this process, a "bubble" tends to form at the center of flat stampings. Magnetic hammer here is ring-type variety.



AUTOMATIC INSPECTION: Aluminum welding wire is checked for flaws as it's spooled at 800 fpm.

Weld Wire Gets Quality Check

Controlling the quality of aluminum welding wire is a must. Flaws usually cause welding troubles.

With an exacting eye, a versatile unit checks any wire size at top production rates.

▪ An electronic nondestructive testing unit called Radac helps to insure production of sound welding wire at All-State Welding Alloys Co., Inc., White Plains, N. Y.

The unit, designed by Budd Electronics, Inc., Long Island City, N. Y., is just the ticket for testing aluminum welding wire on a high-volume basis. The Radac operates at any speed between 40-800 fpm to meet line conditions.

Checks For Flaws—The unit uses eddy currents to seek out voids, laminations and inclusions in the welding wire. Flaws are then recorded on a tape or oscillograph chart.

All-State's engineers modified the unit slightly to meet their needs. Originally, the unit was designed to find a flaw and mark it with dye. In place of the dye marker, machinists installed a pneumatic-powered knife. It's called the guillotine.

The knife is triggered by the same electronic impulses which formerly activated the dye-marker brush. When a flaw is detected, the knife shoots across an enclosed trap and automatically cuts out the substandard section of wire.

Meets Production Needs — Radac's broad range of operating speeds are a boon in the production of welding wire because of variables involved in aluminum-extrusion and drawing processes. What are these variables? Certain aluminum alloys are extruded more rapidly than others because of their chemical compositions.

Wires are made in many sizes ranging from 0.020-0.250 in. diam. Therefore, the first drawing pass runs at different speeds. The testing unit meets the variables of extruded wire by adjusting to exact wire sizes at any speed within a preset range.

The main disadvantage of extrusion has been the occurrence of laminations known as piping. They interfere with weld-metal deposits in Mig and Tig welding jobs. Before Radac was adapted into the company's quality-control system, there was no guarantee for lamination-free wire produced in volume.

Draws the Line—Test standards are programmed on the Radac to eliminate the recording of unimportant variations. Without such programming, every piece of metal would be classified as distinctly different as fingerprints.

By compiling permanent detection charts during the first drawing pass, the company can trace flaw tendencies back swiftly to extrusion variables—or even to a particular billet if necessary.

flowability IS THE SECRET!

BIG HEAD—LARGE BEARING WASHER—THIN SHOULDERS—DEEP, WIDE RECESS—STRAIGHT WALLS—SHARP CORNERS—these are tough specifications that prove the flowability of wire. To successfully produce this fastener requires them all. This is why United Screw and Bolt Corp., Chicago, Illinois, specifies Keystone Special Process Wire for this screw.

K. F. Schmidt, Purchasing Agent for United, says, "We need a wire that gives us improved die life and longer runs. Our experience shows the flowability characteristics of Keystone Wire permit us to cold head exactly to specifications. We find the uniformity of Keystone Wire assures successful production of these clutch head fasteners."

It will pay you to investigate the flowability of Keystone Wire. This may give you that extra advantage you need to cold head more difficult jobs—get greater production—reduce machine downtime—increase die life—make more profit. We'll help you find out.

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NEW PATENTS

Sintering Method

Sintering of iron-aluminum base powders, J. Neri, Jr. (assigned to U.S. Atomic Energy Commission), Nov. 21, 1961. This patent covers an improved method for sintering a superficially-oxidized, metal-alloy powder consisting of 4-11 pct Al and the balance Fe. Small percentages of Si and Sn are added to the alloy powder. Then the mixture is heated from 500-600°C. up to 1300-1375°C. for an optimum period of time. U.S. 3,009,809.

Pellet Treatment

Method and apparatus for treating pellets, P. L. Steffensen (assigned to Bethlehem Steel Co.), Oct. 31, 1961. In the induration of iron-ore pellets, the fired pellets are cooled in one or more separate chambers. The heat is carried to recuperators, where it is used to preheat incoming clean air. Canadian 630,224.

Steel Conditioning

Method of conditioning steel for nitriding, S. Low (assigned to The Chapman Valve Mfg. Co.), Aug. 22, 1961. To prepare it for nitriding treatment, chromium steel is heated in the presence of gaseous derivatives of a fluorocarbon. This process removes the chromium-oxide surface. The steel is then further heated in a nitrogenous atmosphere. Canadian 626,123.

Annealing Process

Process for the transformation annealing of steels, W. Connert (assigned to Deutsche Edelstahlwerke A.G., Krefeld, Germany), Nov. 21, 1961. In the transformation annealing of high-speed steels, structural steels, etc., the steel is heated to about 840°C., cooled to approximately 650°C., and then heated to the required annealing temperature. U.S. 3,009,844.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Building With Steel

Presenting the scope of steel in architecture, a new publication invites practising architects to put steel through its paces. Each issue will present one architect's approach to a hypothetical design problem, stressing steel's varied forms for architectural use. (The Steel Company of Canada, Ltd.)

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Rivets and Riveters

Detailed technical information on applying rivets and rivet-setting machines for low in-place fastening costs is set forth in a new 12-page catalog. Major dimensional specs are listed for standard rivets. Basic capacity data are tabulated for motorized bench and floor-type riveting machines. Details on two pneumatic-riveter models are also listed. (The Milford Rivet & Machine Co.)

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Magnetic Alloys

Magnetic materials—their properties and facilities for their manufacture—are the subject of an eight-page descriptive bulletin. It contains curves and charts that illustrate comparative magnetization and permeability for the various soft magnetic materials. (Materials Mfg. Dept., Westinghouse Electric Corp.)

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Heat Treating System

A new four-page bulletin deals with a fully automatic heat-treating system. It explains in detail how this new equipment automatically heats work at a predetermined temperature, under a prepared atmosphere, holds for the desired time interval, and then moves the work into a cooling or quench chamber. (Hevi-Duty Electric Co.)

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Dry-Film Lubricant

Performance characteristics and application specs for a new dry-film, cutting-tool lubricant are given in a two-page, three-color data sheet. Three-hole punched for loose-leaf binding, the sheet lists the lubricant's benefits, and gives detailed instructions for surface preparation. (The Alpha-Molykote Corp.)

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Metalworking Tools

This new bulletin illustrates a complete line of end mills, solid high-speed steel cutters, insert cutters, shell-mill arbors and adapters. It also includes a six-page spread devoted to special new cutters for aluminum. In addition, the 27-page offering includes pointers on good milling practice. (Goddard & Goddard Co.)

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Welding-Current Meter

An informative, four-page loose-leaf folder describes and illustrates a new portable welding-current meter. Specs, features and method of operation round out the picture of this transistorized instrument. (Duffers Associates, Inc.)

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Industrial Truck

In all, more than two-dozen features of a new electric truck are covered by text and illustrations in a four-page folder. All data are arranged for easy reference. (Elwell-Parker Electric Co.)

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Materials Handling

Emphasis is on safety in a new 12-page catalog. Billed as a guide to improved efficiency in materials handling, the catalog features pro-

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If you want more details on products advertised in this issue fill in below:

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Name .....

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Product Manufactured .....

Company .....

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FREE LITERATURE

tective materials-handling devices. These include insulated links, mechanical back-up alarms and safety hooks for hoists, pullers and cranes. (E. D. Bullard Co.)

For free copy circle No. 9 on postcard

Conveyor Belts

Now available, a new six-page brochure lists 13 specially-impregnated belts. Applications range from foundry use carrying hot castings and shakeout sand to special belting that stays flexible at —60°F. (Imperial Belting Co.)

For free copy circle No. 10 on postcard

Variable Belt Sheaves

Variable-speed and variable-pitch sheaves are the subject of a new 24-page catalog. This line of sheaves covers the horsepower range from fractional to approximately 100 hp. (Browning Mfg. Co.)

For free copy circle No. 11 on postcard

Filtration Data

Magnetic-filtration and wet-separation equipment is described in a new six-page bulletin. This colorful, illustrated offering gives product information and engineering data on ferrous traps, slurry drums and ferrous cleaners. (Eriez Mfg. Co.)

For free copy circle No. 12 on postcard

Pushbutton Switches

This four-page, two-color data package includes photographs, dimensions, electrical data and pricing information on 36 catalog listings of unlighted pushbutton switches. (Micro Switch Div., Minneapolis - Honeywell Regulator Co.)

For free copy circle No. 13 on postcard

To Meter Moisture

In four pages, a new literature offering tells all about a portable moisture monitor. This small low-cost instrument measures the moisture content of gases such as air, nitrogen, oxygen, argon, hydrogen, etc. (Consolidated Electrodynamics Corp.)

For free copy circle No. 14 on postcard

Strip Tacking System

A 19-page illustrated brochure explains how a series of narrow-bodied rolls, in combination with centering devices, automatically keeps strip or web materials centered. The result is higher speeds in continuous strip-processing lines. Additional text and drawings show the development and application of this principle. (United States Steel Corp.)

For free copy circle No. 15 on postcard

Gear-Head Catalog

One special feature of this new catalog is the listing of 439 gear-head and speed-reducer ratios. This listing is unusual in that it includes all the ratios normally required by a designer. Ratio, direction of rotation and prices are tabulated in order for ratios from 3.46-5955.03. (Dynamic Gear Co., Inc.)

For free copy circle No. 16 on postcard

Stainless Bars

A new booklet lists detailed information on the corrosion resistance, fabrication, machining, welding, thermal treatments and mechanical properties of stainless-steel bars. Charts, graphs and numerous photos round out the presentation. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 17 on postcard

The Uses of Air

Entitled "Technical Information About Compressed Air," this easy-to-read manual contains data on the use of air power and correct air-system installations. It also contains a valuable composite of more than 23 charts and graphs illustrating the properties of air under varying conditions. (Wilkerson Corp.)

For free copy circle No. 18 on postcard

Bronze Valves

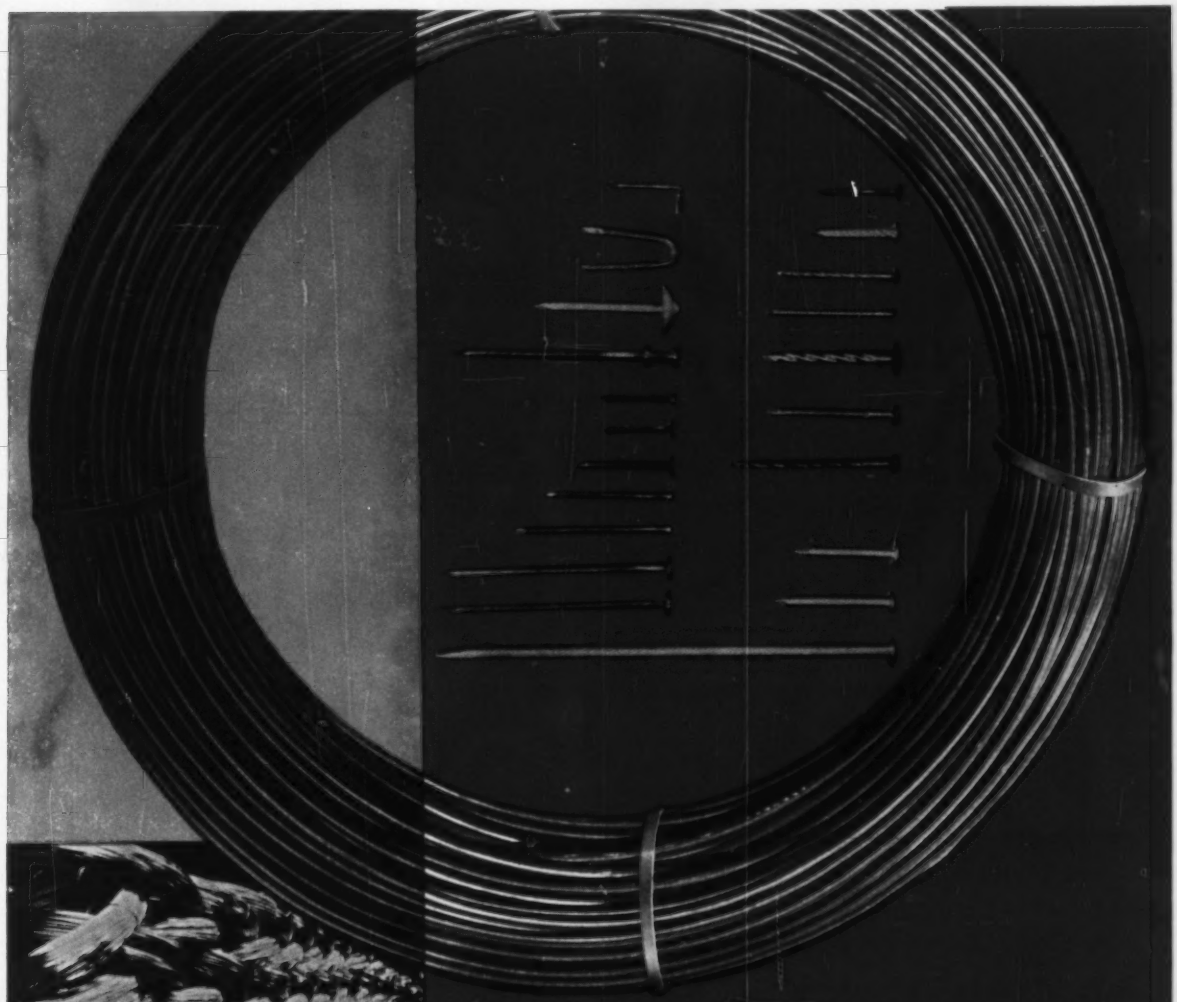
A new condensed catalog summarizes a complete line of bronze valves. It includes separate sections with complete descriptions of gate, globe, angle and check valves for iron pipe and copper tubing. Heating specialties and nonpressure-rated valves are also covered. (Hammond Valve Corp.)

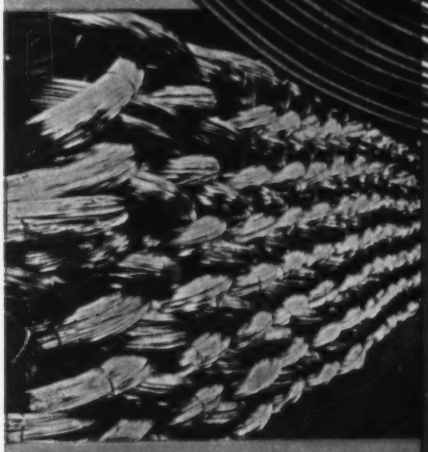
For free copy circle No. 19 on postcard

Air-Cooled Condensers

Remote air-cooled condensers, for horizontal or vertical flow, are the subject under discussion in a new eight-page bulletin. The publication lists operating characteristics, capacities, construction features, dimensions, weights and optional accessories for a line of these items. (Halstead & Mitchell Co.)

For free copy circle No. 20 on postcard





TRADE MARK

Quality Products Pay for Themselves!

In the long run good quality products always pay for themselves. To the consumer a well-made product, whether it is a simple nail or an automobile, means satisfaction and economy through long use; to the manufacturer, good quality materials mean dependability and high reputation. These simple but basic principles have guided Yawata through long years of research and manufacturing experience. Yawata's wire rods, for example, are made from basic open hearth steel in strict accordance with the grades and gauges specified by JIS, AISI, SAE and other standards. All physical and chemical properties are rigidly controlled and guaranteed to meet every specification. Yawata's mild or hard steel wire rods are shipped in coils weighing 705.5 lbs. and are especially suitable for the manufacture of nails, wire, wire nettings, wire lath, wood screws & rivets. The company also produces a variety of other wire products including cement-coated nails, screw nails, and staples or duplex nails. The Yawata seal of approval always means highest quality, economical products.

YAWATA IRON & STEEL CO., LTD.

HEAD OFFICE: No. 1, 1-chome, Marunouchi, Chiyoda-ku, Tokyo, Japan
Cable Address: YAWATASTEEL TOKYO

AMERICAN GENERAL OFFICE: Rm. 1508, 375 Park Avenue, New York 22, N.Y., U.S.A.
Cable Address: YAWATAISCO NEWYORK Tel: MUrray Hill (8) 3327

LOS ANGELES OFFICE: Rm. 1604, Wilshire Flower Building, 615 Flower Street, Los Angeles 17, Calif., U.S.A.
Cable Address: YAWATAISCO LOSANGELES TEL: MA (4) 8071

EUROPEAN OFFICE: Immermann Strasse 15, Düsseldorf, West Germany
Cable Address: YAWATAISCO Tel:

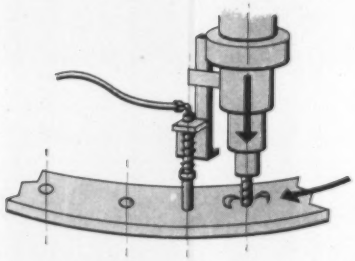
How 1 pneumatic recorder at GE led to 14 more

The first one did such a good job that General Electric's Evendale, Ohio, plant bought an additional 14 Sheffield pneumatic recorders, for application to automatic indexing jig borers.

An adjustable bracket on the quill holds a floating air spindle. After each hole is bored, the spindle enters the hole, automatically records the bore size. If the hole is within limits, the next hole is bored. If the diameter is not within specifications, the operator is warned by both lights and a buzzer.

The Sheffield Pneumatic Recorders proved so reliable that dimensions recorded at the machine have—in many cases—eliminated the need for subsequent inspections.

Write for Bulletin PREC.-212.



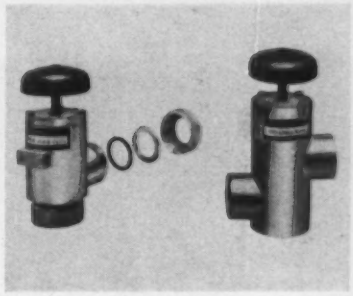
The SHEFFIELD Corporation Dayton 1, Ohio

A subsidiary of The Bendix Corporation

Inspection Gages, Dimensional Control Instruments, Machine Controls, Automatic Gaging & Assembly Systems, Measuray® X-Ray Thickness Measuring, Crushtrue® & Multiform® Grinders, Cavitron® Ultrasonic Machine Tools, Press-Pacer® Transfer Units, Large Dies, Tooling, Contract Manufacturing.

New Materials and Components

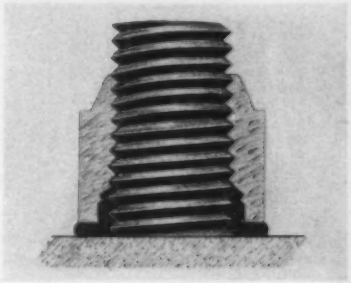
High-Vacuum Valves Boast Plasticized Seals



This new line of high-vacuum valves features all-plasticized mechanical seals and integral quick-connect fittings. Air or manually operated, the line includes 11 standard sizes from ½-4 in., in both angle and in-line types. The buyer can specify quick, sweat, welded or flanged connections. Designed for high conductance with non-restrictive ports, the valves have bellows-sealed stems. They're machined from solid brass or stainless-steel bar stock. Stainless-steel units are brazed in a hydrogen furnace to virtually eliminate leakage. (Vactronic Laboratory Equipment, Inc.)

For more data circle No. 25 on postcard, p. 53

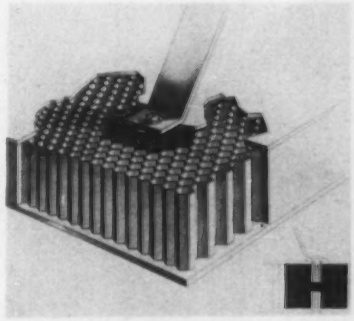
New Industrial Locknut Takes 1000-Psi Pressure



An established manufacturer of industrial fasteners has announced a new industrial-type locknut. According to the company, this fastener locks against back-off as tight or tighter than any other locknut. It also forms a thread seal so effective it withstands 1000-psi liquid pressure. In addition, a thin film of nylon is formed between the locknut bearing and the part to which it is applied. This reduces the amount of torque needed to seat the nut. At the same time, it practically eliminates "squeak" tendencies found in many metal-to-metal fasteners. (Eaton Mfg. Co.)

For more data circle No. 26 on postcard, p. 53

High-Strength Adhesive Cuts Stud-Mounting Costs



According to the manufacturer, a new high-peel strength adhesive can cut stud-mounting costs in fiberglass or aluminum sandwich structures by as much as 85 pct. At the same time, it allows the stud to carry its full design load. In use, a new assembly technique replaces the old hand-layup method. Now, a hole is drilled and the stud sleeve inserted. Then the adhesive/sealant is applied cold with a pressure gun to a 2-in. radius around the stud. Covering skin is applied and cured in the usual manner. The adhesive cures right along with it. At 25°C, pot life is 3-4 days. Peel strength is 63.6 in.-lb. Tensile shear is 3300 psi. (Hysol Corp.)

For more data circle No. 27 on postcard, p. 53

Tiny Silicon Switch Handles Big Power Loads

Development of a subminiature, light-activated silicon switch has recently been disclosed. Although it's still technically in the development stage, the newcomer is now available in five voltage grades for sampling purposes. Despite its extremely small size, the unit switches up to 160 w of load power on a continuous basis, or up to 2 kw for one cycle. How big is it? The housing is only 0.30 in. long; while the diameter is a mere 0.125 in. Weight is just one-fourth of a gram. In operation, a momentary impulse of light, between 80 and 500 foot-candles in intensity, is strong enough to trigger the switch. Like other silicon voltaic devices, it responds to light in the 0.4-1.1 millimicron region, peaking roughly at 0.8 millimicrons. (General Electric Co., Rectifier Components Dept.)

For more data circle No. 28 on postcard, p. 53

One in a series of performance studies of Armour Coated Abrasives

ARMOUR coated abrasives work for Chrysler

. . . help Chrysler produce 55 cars an hour

"Armour abrasives contribute to the quality finish that identifies our 1962 automobiles," says a company spokesman at Chrysler's Newark Assembly Plant in Newark, Delaware. Over 4400 Dodge Darts, Lancers, Plymouths and Valiants are produced for the eastern states every week here.

"All abrasives used here are job-tested. We take competitive abrasives and work them under exactly the same conditions. We even use the same men since each operator has his own working characteristics which exert different kinds of wear on the abrasive. Armour meets every one of our specifications," he continues.

No matter what your production requirements are, it will pay you to use Armour Abrasives. Our standing offer is—put Armour to work on your toughest jobs. Then look at the improved results —more production, higher quality, less downtime and less cost.

Armour distributors are located throughout the country. They're experts in the abrasive field and have the technical background to assist you on your toughest jobs. In addition, they're backed by over fifty years of Armour's experience in solving the most diverse abrasive problems.

Wouldn't you like a detailed technical report describing Chrysler's experience with Armour Coated Abrasives? Write for Report M-101 to Armour Alliance Industries, Coated Abrasives Division, Alliance, Ohio.

Assembly workers use Armour 360 grit Rubwet® paper to sand down excess paint after trim paint has been applied to 1962 Dodge. Quality-controlled production of nearly a car a minute requires a tough, efficient, long-lasting abrasive.

Seven different sizes of resin fibre discs with five different grits are used to grind down a mixture of 4% tin and 96% lead solder at the body joints. High production rates call for high performance Armour resin fibre discs.

the new Armour and Company

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND FOUNDRY

DIVISION OF GORDON STREET, INC.

CHATTANOOGA 2, TENN.

WARD

For Countless Uses of

SPRING STEEL

AMERICA'S LEADING SUPPLIER Where SERVICE and QUALITY is the rule

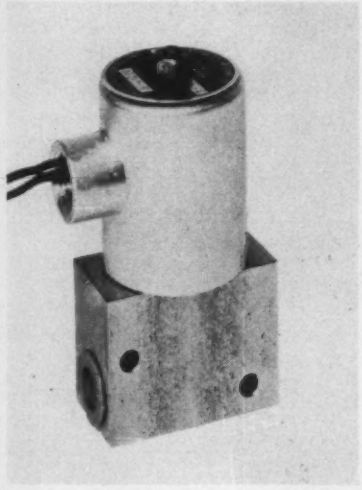
WARD STEEL CO.

Boston—Cambridge, Mass.
Chicago, Ill.—Greensboro, N. C.

DESIGN DIGEST

Two-Way Solenoids

New, two-way solenoid valves work well with oil pressures up to 3000 psi. Two types are available in the line: Normally-open and normally-closed. Both are pilot-operated poppet-type valves in cartridge form. Both adapt to any type of manifold or subplate. All standard ac and dc solenoids are interchangeable. Only two moving parts—poppet and plunger—make these valves less susceptible to malfunctions resulting from contaminated systems. In addition, all valves have free reverse flow in either energized or de-energized positions. Hardened, ground and lapped parts, plus an

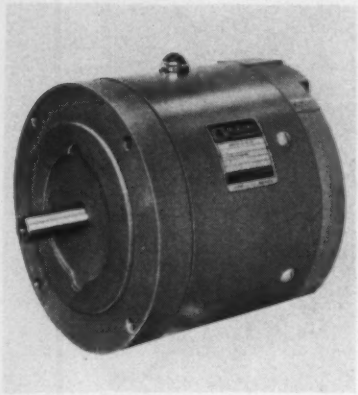


oil-emersed plunger insure long trouble-free operation. Also, many modifications are possible to suit specific requirements. (Fluid Power Accessories, Inc.)

For more data circle No. 29 on postcard, p. 53

Provides Digital Pulse

Designed specifically for industrial digital-control systems, this pulse generator provides a digital output that's a function of the speed or accumulated rotary position of its input shaft. Its sturdy mechanical design in no way affects its accuracy. It will operate from zero speed up to 4000 rpm and accurately generate a maximum of 15,000 pulses per second. Each pulse is a 15-v square wave at all speeds. Minimum duration, at top speed, is 25 microseconds. The pulses are suitable for driving counters and

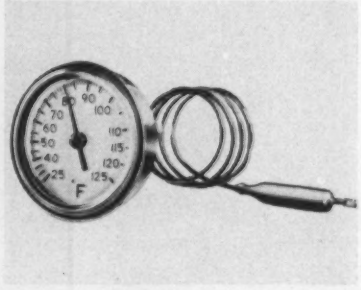


various other types of digital-control equipment. (Reliance Electric & Engineering Co.)

For more data circle No. 30 on postcard, p. 53

Versatile Thermometer

Developed to provide dependable and accurate temperature measurements, a new remote-reading thermometer is good for use with a wide range of specialized service and processing equipment. It's hermetically sealed in a space-saving cylindrical case that is available in a wide variety of materials and finishes. The thermometer unit itself comes in 17 different scale ranges —from —40° to 60°F all the way up to and including 100°-350°F. Other ranges and scales can be supplied on request. In addition, the device comes in various copper, plain, plated, or braided capillary tube lengths as well as in four differ-



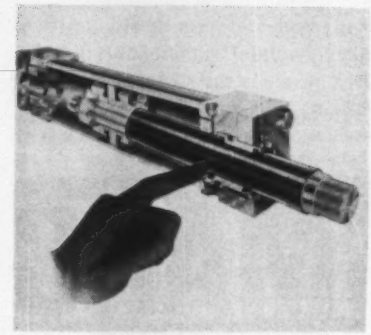
ent mountings to meet manufacturers' particular production requirements. Calibration is nominally 3 pct of the scale span. One unusual design feature is found in the sensing element. It's a multiple-turn spiral bourdon coil proved in rugged

Navy shipboard service. This spiral coil's inherent resilience lets the thermometer withstand severe vibration without undue wear. (American-Standard Controls Div.)

For more data circle No. 31 on postcard, p. 53

Bronze-Coated Rods

With a new piston and guide rod material, bronze bearing material is put on the large area of the shaft, instead of being confined within the bushing. This provides a substantial reduction in the cost of bushing and rod replacements. Another significant benefit is savings in downtime production losses. Also, in many mechanisms, size and weight are reduced. Cost of lubrication likewise goes down. Here's how it's done. High-quality bearing bronze is fused on the surface of a steel rod. This rod is subsequently ground

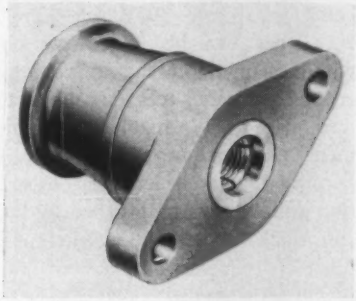


and straightened to very close tolerances. The bronze fusing is done by a high-temperature spraying operation which deposits a coating of controlled porosity for excellent lubrication retention. Lubricant won't wipe off. Additionally, the amount of lubricant stored is enormous, since it's retained all over the relatively large surface. (Thomson Industries, Inc.)

For more data circle No. 32 on postcard, p. 53

Separates On Demand

This shrouded-type separation nut is one of a series of separation devices in which the mechanical system is actuated by a gas-generating power cartridge. It's especially designed for use where fragmentation is not permitted, since all component parts are completely contained during separation. There's no danger of damage to the adjacent structure or equipment. Since the shroud captures the nut and its fragments, the shroud also retains



pressure from the power cartridge. This gas acts as an aid in the ejection of the bolt. (Hi-Shear Corp.)

For more data circle No. 33 on postcard, p. 53

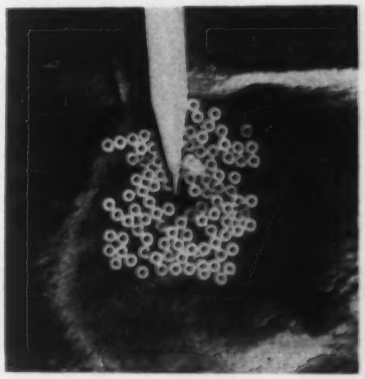
Standoffs and Spacers

These spacers are used for separation or support of components or structural members in electronic assemblies, gear trains, mechanisms, and multisection switches. The tubular spacers have precision machined ends and accurately controlled lengths and are available in round, square or hexagonal outside diameters. A choice of aluminum, brass, corrosion-resistant steel or cold rolled steel is available. The right stock spacer for any given application is simplified by a wide selection of stock sizes and protective finishes. Posts are designed to support and separate components or structural members without the need for long screws or machine nuts. They are used widely in electronic, electro-mechanical and mechanical assemblies. Thousands of stock variations are available in prototypes and production quantities. (Angler Industries, Inc.)

For more data circle No. 34 on postcard, p. 53

Clad Metal Washers

These unusually flat metal washers excel as base tabs or rings in semiconductor manufacture. The washers have a combined flatness and burr of less than 0.0005 in.—a remarkable tolerance — in sizes ranging from ID 0.030 in. and up. Available in molybdenum, nickel-iron or Kover cores, they're furnished with gold, silver and indium alloys or solders. The super-flat washers can be clad on one or both sides with either single or double cladding thicknesses. All are sealed



in argon-filled containers to eliminate contamination or oxidation, and to extend shelf-life almost indefinitely. (Semi-Alloys, Inc.)

For more data circle No. 35 on postcard, p. 53

Wheels

An attractive two-tone color effect, plus a new type of patented steel construction, distinguish this

"We don't want sulphur in our lime and 'Mississippi' has the least."

"We don't want silica, phosphorus and other impurities either. That's why we always specify 'Mississippi'."

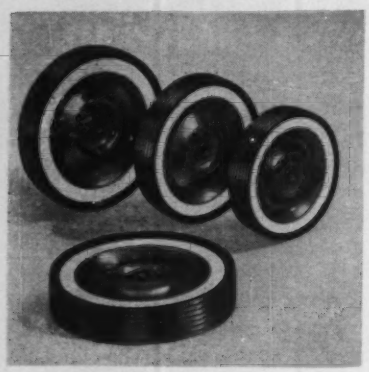
Immediate shipment of uniformly pure lime in any quantity anywhere by barge, by rail, by truck.

See our specifications in Chemical Materials Catalog, page 525.

MISSISSIPPI LIME COMPANY

ALTON, ILLINOIS

line of versatile rubber-tired wheels. Offered in 6-, 7-, 8-, and 10-in. OD, the wheel is presently available in



nine tire widths, from 1.375-1.750 in. Various tread patterns, in standard sizes, are also available. (Swift Mfg. Co., Inc.)

For more data circle No. 36 on postcard, p. 53

Helpful Tube Joint

A proven joining principle has now been adapted for a new type of tube joint. Called Flexmaster, the joint is available in tube sizes from 1 in. through 4½ in. The joint was designed to meet ASA requirements for 150 lb service with a large margin of safety. It will withstand temperatures from −30°F. to +250° F. Tubes can be joined quickly without flanging, threading, welding, grooving or other tube-end preparation. Up to 4° angular misalignment and axial tube adjustment is permitted without leakage. Vibration and shock are absorbed by the soft, thick rubber of the gasket. All other components are made of corrosion resistant cad plated steel with post chromate bronze finish. (Marman Div., Aeroquip Corp.)

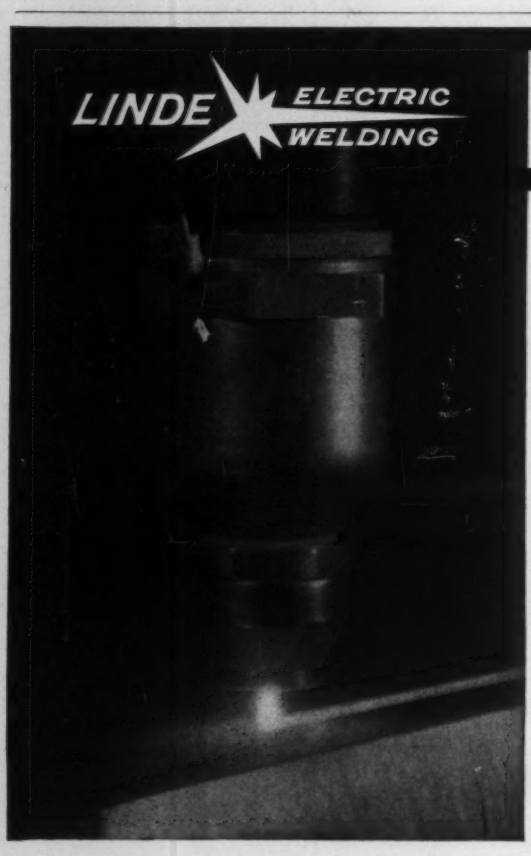
For more data circle No. 37 on postcard, p. 53

Aluminum Solder

Here's a new aluminum solder that resists corrosion, is non-toxic and requires no pre-cleaning. Moreover, it is designed to provide unusually effective joint strength. One key to these advanced features is the patented flux core. It provides a higher melting point than soft solders commonly used in sheet-metal work. But, the melting point of 780°F is still enough under that of aluminum to avoid danger of

melting the work. The new solder will join commercially-pure or low-alloy aluminum to itself, or to stainless steels. It's designed to flow easily without running through the joint or along the surface of the aluminum. (Scientific Products. Inc.)

For more data circle No. 38 on postcard, p. 53



PLASMARC

NEW... FIRST PROCESS FOR HIGH-SPEED, DROSS-FREE CUTS IN 5-IN. METALS

LINDE, inventor of plasma arc processes, now introduces *advanced* PLASMARC cutting for high-speed severing of metals up to 5 in. thick, dross-free.

PLASMARC cutting utilizes an intense plasma jet (20,000°F.) of near-sonic-velocity (4000 ft./sec.), which melts-and-forces a narrow kerf through the metal. After six years' success, it is now replacing shearing, sawing, powder cutting—slower methods which usually require machining of the cut edge. *PLASMARC cutting delivers these advantages:*

- Dross-free cuts in stainless steel (2 in.), aluminum, magnesium, copper up to 5 in. thick.
- Clean-cuts 4-in. stainless, nickel, carbon steel (without iron powder), "Monel," "Inconel," cast iron, high-alloy and clad steels.
- High-speed cutting—up to 300 ipm.
- Precise cuts—holds tolerances to 1/16 in.
- Narrow heat band—as thin as .006 in. wide.
- Little or no change in metallurgical properties.

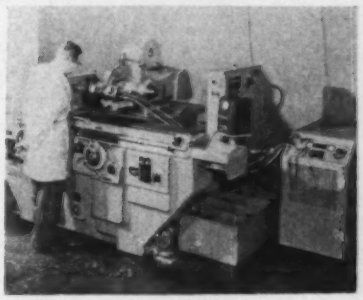
For full details, contact your local LINDE office or write direct.

LINDE COMPANY
Division of Union Carbide Corporation
270 Park Avenue, New York 17, New York

UNION CARBIDE

New Equipment and Machinery

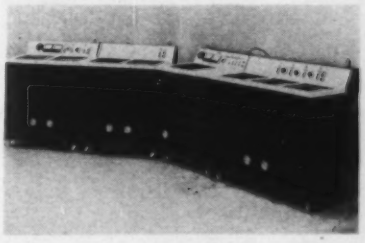
Spindle Unit Uses Hydrostatic-Bearing Principle



A new internal grinding spindle unit features hydrostatic bearings. In the absence of sleeves, balls or rollers, the spindle floats on pressure pads of oil, revolving with extreme smoothness. Thrust is also taken up by pressure pads of oil. This arrangement prevents end camming. With no metal-to-metal contact, wear is virtually non-existent. Precision performance can be maintained for an indefinite period. Furnished from an enclosed power pack, twin-turbine jets of fluid provide a vibration-free spindle drive. Torque reaction is held to a minimum. (Browne & Sharpe Mfg. Co.)

For more data circle No. 39 on postcard, p. 53

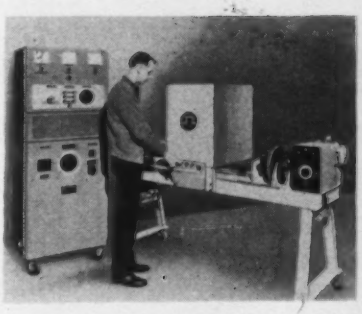
Mobile Plating Plant Provides Versatility



Development of a mobile packaged plating plant has recently been announced. It will handle electroplating with all precious and base metals. The new equipment is said to be basically a modular plating plant consisting of integrally-designed tanks and processing vessels which are mobile and interchangeable. Its main components can be moved easily, or modified to accommodate changing mechanical needs. (The Meaker Co.)

For more data circle No. 40 on postcard, p. 53

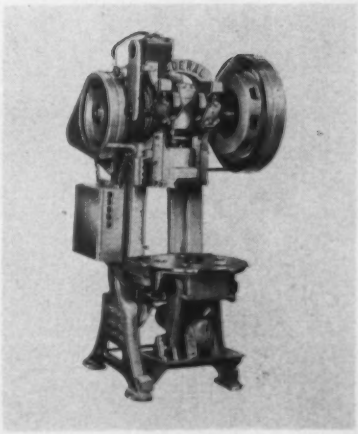
New Spot Welder Joins at Ultra-High Speeds



Built on a new resistance-welding principle, this prototype machine welds stainless-steel foil at the amazing rate of 2000 spot welds per second. The system uses an electronic control unit and a welder. Electrodes are copper disks which are set in gangs of one to six or more. Once the control panel has been set for thickness and type of material being welded, it automatically feeds pulses of the correct intensity, duration and rate of speed to the disks. The disks spot weld as they roll over the metal—providing an overlapping series of spot welds which form a gas-tight seam. Single spot welding is also possible. (Maxim Controls Co.)

For more data circle No. 41 on postcard, p. 53

Dial-Feed Presses Have Independent Index Tables



Independent drive on the indexing tables is just one of the highlights on a new line of dial-feed presses. It makes the work area more accessible, and introduces new versatility to press operations. Dial operation is not limited by the operator or the speed of the press. The dial can also be built to index at any number of predetermined stations. Speeds can be fixed or variable, ranging as high as 300 indexes per minute. In addition, each stroke of the press is controlled by an electric signal from the index unit. Thus, the chances of damaging expensive dies are almost nil. To insure perfect alignment at every station, there's a safety stop mechanism with a shot pin that checks at every index. Of course the index mechanism can be removed from the press at any time. This leaves you with a standard press that boasts the advantages of an air clutch. The indexing unit also comes separately. (Federal Press Co.)

For more data circle No. 42 on postcard, p. 53

Cosco Stools, Tables, Carts are . . .

"Made Like A Million" with Pittsburgh Steel Sheet

Make your products "like a million" and you'll sell them by the million.

That's the philosophy practiced at Hamilton Cosco, Inc. of Columbus, Indiana, manufacturer of nationally known Cosco brand tubular steel frame household and juvenile products and office chairs.

And the philosophy has paid off.

Introduced 16 years ago, Cosco household stools have averaged nearly a million units a year. Their success led to development of other popular Cosco products ranging from baby jumpers to executive office chairs.

Pittsburgh Steel Company plays an important part in Hamilton's success by supplying substantial quantities of cold rolled sheet that consistently meet Cosco's ultra-critical requirements.

For, at Hamilton there's no such thing as a "second" in a finished product, be it serving cart or stool, playpen or folding bridge chair. The slightest imperfection — in forming, bending, painting or plating — requires reprocessing or scrapping of the defective item.

Supplying cold rolled sheet that faithfully meets such air-tight quality control places unusual responsibility on the steel supplier.

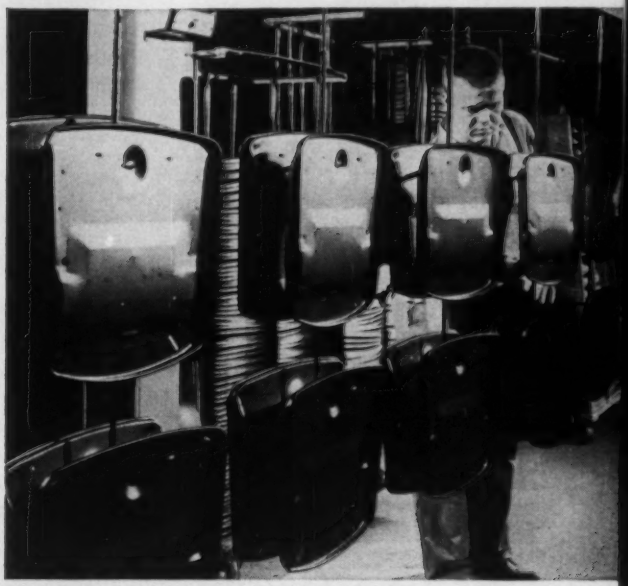
But, Pittsburgh Steel regularly meets this obligation with sheet known throughout the metalworking industry for its three "F" qualities:

- **Flatness** — for exposed surfaces where appearance is vital and for fast production on automatic and semi-automatic equipment.
- **Finish** — dense, exceptionally clean surface for critical finishing operations, particularly Hamilton's electrostatic painting process.
- **Formability** — for precise uniformity in stamped, drawn, rolled or bent shapes; and especially for non-fluting characteristics in difficult bends on electric-welded tubing rolled

The three "F" features of Pittsburgh Steel sheet—**flatness, finish, formability**—show up in assembly of the popular Cosco "Hour Glass" step stool. Gleaming backrests, gracefully curved tubular legs and brackets, seat pans and fold-away steps, all reflect quality of Pittsburgh cold finished sheet.

Flatness of Pittsburgh cold rolled sheet is critical for appearance, rigidity of stool seat and for trouble-free production in long runs. Here, after forming and piercing, raw edges are turned under.

Formability of Pittsburgh Steel sheet is demonstrated here as ¾ inch tubing, rolled from slit sheet, takes severe bends and deformation required for backrest brackets. Non-fluting quality of steel on radius of bends is vital on this and all other tubular parts produced by Hamilton Cosco, Inc.



Finish of Pittsburgh Steel sheet provides dense, exceptionally clean surface for tight, smooth paint adherence required by Hamilton's electrostatic painting process. Seat pans for Cosco's unique gatefold card table chairs show painting quality of steel.

from Pittsburgh Steel sheet.

H. E. Spurgeon, purchasing agent, said:

"The company's success is based on its insistence on absolute quality of its products—and that means quality starting with raw steel. We do many things merely because it's the best way.

"Performance of Pittsburgh sheet is very good, we've found. Over-all, I'd say Pittsburgh Steel is a very satisfactory supplier."

Pittsburgh Steel Company sheet—the steel with the three "F" qualities—can help step up your product quality, too, whether you're using hot rolled or cold rolled, sheet widths or strip widths. Contact one of the Pittsburgh Steel Company District Offices listed here. We'll match the steel to your product.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

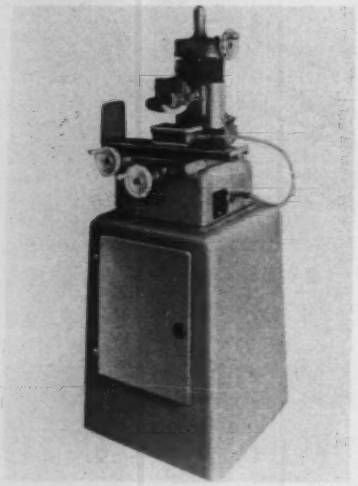
DISTRICT SALES OFFICES

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

NEW EQUIPMENT

New Surface Grinder

According to the manufacturer, three principles guided the engineering development of this new surface grinder: Precision, stability and sensitivity. For instance, the grinding wheel and spindle ride on two (not one) hardened precision-ground steel columns. The grinding wheel itself is flange mounted with two adjustable counterweights for precise balancing. There are built-in verniers at both the elevating and crossfeed handwheels, and the geared spindle-elevating screw has a 1.2 ratio for greater sensitivity. The precision-tapered spindle mounts on four tapered ball bearings. Spindle play is taken up automatically. The spindle's belt driven from the motor—a ⅓-hp, three-phase unit. (American LIP Corp.)



For more data circle No. 43 on postcard, p. 53

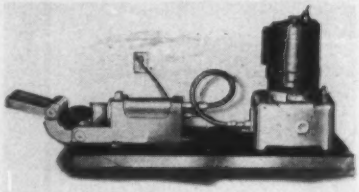
Low-Cost Automation

Many production processes that should be automated aren't because program controllers prove too costly. For simple automation installations, a new programmer solves this cost bottleneck. Called the Programat, the newcomer uses a time-expansion principle in issuing commands to machine tools or production processes. With this electro-mechanical controller, the time lapse between any two production steps can be expanded from 5-150 seconds. (Schrack Electrical Sales Corp.)

For more data circle No. 44 on postcard, p. 53

Cuts Wire Rope

According to the manufacturer, a striking speedup in cutting time of wire rope, with increased capacity, is insured by a new wire-rope cutter. The new model features an electric-hydraulic pump that's hose connected to the cutter body. Here's a sample of fast action: About five seconds is all it takes to cut ½-in. rope; 2½-in. rope takes just 25 seconds. In between sizes are sliced at proportionate speeds. Several wire-rope strands can be cut at one time without any special adjustments. The cutter pump is powered by a 1-hp, 1725-rpm, 115/239-v, dual-speed ac motor which will plug into any lighting circuit. No special wiring is needed. Blade sharpening or replacement takes just a few seconds. (Pell Cable Cutter Co.)



For more data circle No. 45 on postcard, p. 53

Seals Steel Strapping

A new stretcher-sealer combination tool provides convenience, efficiency and economy in tensioning and sealing heavy-duty steel strapping. Combining of two rugged steel tools into one manually-handy unit makes strapping faster and easier than with a separate stretcher and sealer. Strap feeds directly from the coil. Thus, you don't need to use cut-to-length strapping. The result is nearly a 10 pct saving in strap costs because of the waste

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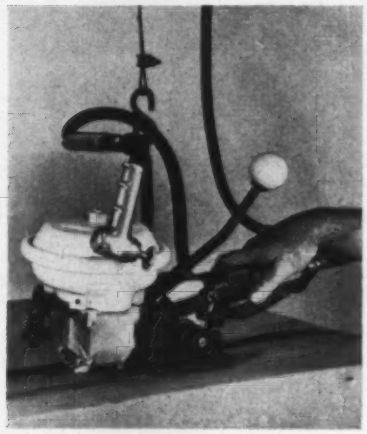
about personnel problems

Dissatisfied with present recruiting methods? The IRON AGE Employment Exchange is the meeting place for employers and men qualified in all phases of metalworking. For advertising rates, write to Chestnut and 56th Sts., Philadelphia 39, Pa.

that's eliminated. Simple finger-tip controls let power do the work. After inserting the strap and posi-

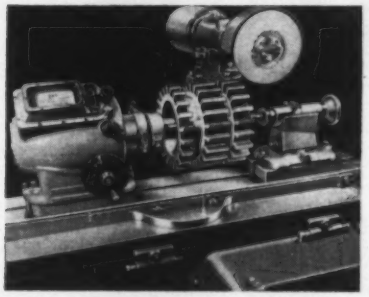


tioning the seal, the unit automatically tensions, seals and shears the strap. (Acme Steel Co.)

For more data circle No. 46 on postcard, p. 53

Optical Grinding Head

Weighing in at less than 45 lb, this new optical dividing head lends itself to toolroom applications. It

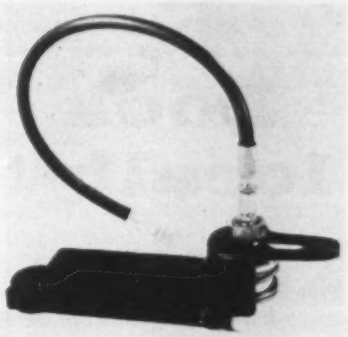


can be mounted to small jig borers, milling machines and grinders without any danger of distorting the machine slides. Full-circle readings of angles are performed optically from a master glass circle. This circle is permanently fixed on the main spindle to maintain its original concentricity. In use, the operator observes a line image which is projected from the glass circle onto an easy-to-read glass screen. This eliminates the less-convenient eyepiece arrangement. (Parker-Hartford Corp.)

For more data circle No. 47 on postcard, p. 53

Automatic Clamping

Engineered to bring automation in work holding to the field of small-lot production, these new clamping straps are designed as a replacement for the conventional bolt-down clamping strap. Two sizes, with built-in hydraulic actuators, are currently offered. They provide pushbutton, almost instantaneous, clamping. And they're easily set up to hold work pieces of different shapes and sizes. Machine productivity is increased and operator fatigue is eliminated. Pushbutton electrical controls are standard equipment. All accessory components are designed on a fail-safe basis. There's no valving on the high

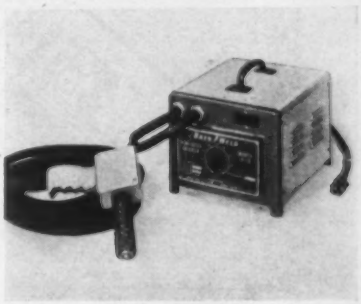


pressure side, and only one hydraulic line per clamp. (CSE Industries, Inc.)

For more data circle No. 48 on postcard, p. 53

Low-Cost Stud Welder

According to the manufacturer, this new automatic unit is the lowest-priced stud welder available today. Designed without pushbuttons or triggers, the gun is truly automatic with self-starting circuits. All the operator has to do is press the stud against the work. Welds are automatically timed since the gun shuts itself off when the weld is completed. One advantage of this simplicity is that an operator needs



no prior welding experience. The stud welding gun can be operated by anyone. Models are available for either 110 or 220 v. The gun comes complete with both stud and spot welding tips. The complete power pack measures just 8½ x 12 x 12½ in. (Bren/Weld Corp.)

For more data circle No. 49 on postcard, p. 53

Controls Dust

This newly-designed transparent air-control enclosure removes dust particles less than 0.5 microns. Lightweight, tough and resistant to chemicals, the plastic enclosure boasts 11 cu ft of working space. For ease of cleaning, the enclosure is deep drawn with a smooth radius in every corner. Its easily maintained double filtering system is also free of protrusions and sharp corners. Designed for the exacting needs of one of the world's largest laboratories, the versatile unit is being used for various applications where control of dust, fumes, moisture and inert gases is essential. (Colonial Plastics Corp.)

For more data circle No. 50 on postcard, p. 53

LINDE ELECTRIC WELDING
PLASMARC
NEW...THIN, FUSED DEPOSITS WITH CONTROLLED DILUTION
NEW...HIGH-SPEED, DROSS-FREE CUTS IN 5-IN. METALS
FOR MORE DETAILS, SEE PAGES 63 & 83 OF THIS ISSUE

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110 Million Tons of Steel in '62

Based on a first-half surge in steel demand, the forecast for 1962 adds up to 110 million tons.

The buildup rate is faster than in 1959. The outlook for labor peace is dim. Most of the forces that caused the 1959 strike are still present.

■ Total steel production in 1962 should exceed 110 million tons.

Well over half of the total will be poured in a first-half surge, which could account for 65 million tons of steel ingots produced in the first six months of the year.

The high total for the first six months will be brought about by hedging against a possible steel strike after the contract between the steel companies and the United Steelworkers of America expires on June 30.

Strike Talk—Looking ahead to the strike deadline, only something that is not now present in the labor picture could avoid a strike. Most of the factors present in the 1959 negotiations are still present and little has been done to ease the pressures that caused the prolonged strike in 1959.

In fact, union demands for job security have strengthened and this shapes up as the key factor in negotiations. The steel companies, hard-pressed on the cost front from competition within the industry, from foreign steel, and from other materials, are not likely to settle for any package that means large wage-cost increases.

Strong Demand—Strike hedging is not the only factor behind the first half production surge. General business conditions are moving ahead rapidly and strike hedging comes on top of rapidly increasing demand for steel.

In addition, many steel consumers believe the contract settlement will be followed by a steel price increase. This encourages the incentive to build inventories.

Leading 1959—The current order buildup is running a full month ahead of the pickup that preceded the 1959 steel negotiations. The current rate of production in the last week of December was not reached until February of 1959.

The present rate of production, if continued through the first half of 1962, would result in about 57 million tons. And this rate has been reached without support of large orders for oil country goods, freight car production, pipe jobbers, and miscellaneous users. When these consumers come into the steel market, the production rate will have to go up. This accounts for the forecast of possibly 65 million tons of steel produced in the first half of the year.

Deliveries Lengthen — The strength of the current market is still coming from the automakers, appliance manufacturers, and demand for tinplate and galvanized steel. This places the emphasis on flat-rolled products. These big steel users are also urging their suppliers to build up stocks well in advance of June 30.

The result has been some rapid lengthening of lead time and delivery promises for flat-rolled products. In some cases, delivery promises are now out as far as 10 weeks, with more lengthening in propect.

This means that consumers who have not yet made their plans for first half steel will have to move or face the danger of being shut out later as the market squeeze tightens.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	N.A.	115	105	52
Buffalo	N.A.	116	104	54
Pittsburgh	N.A.	111	103	49
Youngstown	N.A.	100	92	38
Cleveland	N.A.	125	104	52
Detroit	N.A.	153	150	68
Chicago	N.A.	128	113	75
Cincinnati	N.A.	129	139	72
St. Louis	N.A.	130	129	57
Southern	N.A.	111	97	65
Western	N.A.	103	106	81
U. S. Index	N.A.	118.1	109.1	59.2

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	N.A.	2,200	N.A.	N.A.
Ingot Index				
(1957-59=100)	N.A.	118.1	N.A.	N.A.
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.32
Scrap No. 1 hvy (Gross ton)	$35.17	$34.50	$32.83	$29.17
No. 2 bundles	$24.17	$24.17	$23.17	$19.17

Licensing Is Not Big PA Need

A top staff man of the purchasing association gives progress report on buyer certification.

All-around professional development is the big need, not a license, he says.

Needed are a knowledge of engineering and mathematics to keep up with technical trends.

■ Will there be a purchasing agent's license on your office wall in the near future?

"Not likely," says Marshall G. Edwards, a top staff man of the National Assn. of Purchasing Agents. Mr. Edwards largely specializes in professional development activities of the 17,000 member group.

"The association is accumulating data on licensing and certification of purchasing men," says Mr. Edwards. "But there has been no official action.

As the NAPA is by far the largest national purchasing group, this is where any national move in the direction of licensing is likely to occur.

Start Made — Mr. Edwards reports that one large buyer group in the country is moving towards certification in the near future. This is a California group of local and state government buyers. The group is now giving tests and examinations to members as part of a certification process. But the group has no affiliation with the NAPA.

"When I talk to purchasing men who express interest in licensing," says Mr. Edwards, "I like to pose one certain question. I ask: 'Just what is it that you as an individual want when you talk about licensing or certification?' Too often, I find that there is not a real professional objective to their interest in licensing.

M. G. EDWARDS: "Too often I find that there is not a real professional objective to their interest in licensing."

"If the interest is one of professional concern, then I urge them to do something about it."

The NAPA official explains that a motion has to originate at the grassroots level, or local groups, before the staff can start action on any such matter.

The Real Job—Rather than push licensing, Mr. Edwards and the NAPA staff are moving ahead with an expanded professional development program. This is done, he says, "with no certification in mind except a well-equipped purchasing man."

The professional development program of the NAPA, explains Mr. Edwards, is keyed to all levels of purchasing needs. This means it covers all elements of job need from elementary purchasing to purchasing management.

And secondly, he is charged with keeping completely current and up-to-date on the changing needs of purchasing men.

In coordinating local professional development groups in all 50 states, Mr. Edwards is in as good a position to assess the changing needs of purchasing men as anyone in the country. Here's what he told the Iron Age about the "new" needs of purchasing agents:

"Drawing new emphasis," he said, "is the ability of purchasing men to talk to and understand technical men."

Technical Need — "This means that a knowledge of engineering and mathematics is needed. And there is the necessity of buyers to keep up to date on technical trends and developments."

Mr. Edwards points out that PAs are "in the middle" in their need for greater technical knowledge. They must be able to understand and deal with engineers in their own companies as well as with suppliers. And often, buyers do general purchasing. This means that while they are "generalists," they are often dealing with specialists.

Big Change — "As little as 10 years ago," says Mr. Edwards, "the PA could do his job and get along well. Now, he has to be constantly preparing himself for new challenges. As technical products, processes and trends change, his very job changes."

And Mr. Edwards urges PAs to go beyond even the courses and seminars run by his organization. He urges that they "read a lot with the broader viewpoint in mind."

Ernst cuts steel costs to customers up to 10% with three new Wean Coil Processing Lines

During a recent call on Ernst Iron Works, Division of Ernst Steel Corporation, Jim Moon, sales engineer of McKay Machine (above left), talked with Carl Grosse, plant superintendent, about the three Wean coil processing lines recently installed by this major metals warehousing firm.

According to Mr. Grosse, the Wean slitting, shearing and coil banding lines have reduced Ernst's handling, labor and scrap costs up to 10%. In addition to providing lower costs to Ernst's customers, this modern coil processing system helps this firm give fast service while easing inventory and supply problems through the purchase of standard size coils.

Equipped with modern, automatic controls, the Wean coil processing lines are operated by only four men and can handle 20,000 lb. coils, up to 54" wide and from .015" to .135" thick.

The McKay Machine Company, Youngstown 1, Ohio

The McKay Machine Company is licensed to manufacture, sell and service metal processing machinery formerly manufactured by Wean Equipment Corporation, Cleveland, Ohio.

McKAY McK MACHINE

Deliveries Move Up Two to Four Weeks

Mill delivery estimates advance sharply as users buy more steel for inventories and immediate use.

Products most affected are sheet, strip, and bar. In some areas, cold-rolled sheet deliveries are now 8-10 weeks.

■ The stretchout in mill deliveries is gaining momentum—fast.

Based on tonnages booked with mills through the first two months of '62, delivery estimates are moving up. In some cases, mills are now quoting 8-10 weeks on cold-rolled products.

Cold-Rolled Popular—The situation, of course, varies according to the market and the product involved. Generally, sheet, strip, and bar are the items most affected. Cold-rolled sheet delivery promise increases average three weeks. At Detroit and Chicago cold-rolled shipping estimates have extended four weeks.

Moving East—Traditionally the market tightens from the Midwest eastward. This pattern is now appearing. At Chicago virtually all products, including plate, wire, linepipe, buttweld pipe, and structurals, are on extended delivery.

Further east, gains at Detroit and Cleveland are confined mainly to sheet, strip, and bar. This also holds true at Pittsburgh and on the East Coast. But in those areas cold-rolled sheet has not lengthened as much.

More to Come—Deliveries along the West Coast are also moving up, mostly on flat-rolled products.

The delivery stretchout is only a prelude of things to come. Mill shipping estimates are still extending. When ordering picks up even more early in '62, mills will be forced to quote still longer delivery estimates.

Sheet and Strip—Most mill books for February are just about filled on hot and cold-rolled sheet, galvanized, and long terne. Orders from regular customers are still being accepted at **Pittsburgh** area mills. But newcomers are being turned away. Users with established order patterns are being warned not to delay orders. Most **Cleveland** mills are talking in terms of March delivery. Coated products and those needing special annealing are much tighter.

Some **Chicago** area buyers are ordering flat-rolled as much as 90 days ahead. They point out items like galvanized sheet, enameling iron, and, in some cases, tinplate, can require 10 weeks delivery.

Plates and Shapes — East Coast buyers are starting to build structural inventories. But this has not lengthened mill deliveries — yet. Plate is still not too active. Reasons given are a slow market and lack of inventory building. More buying is expected soon. At **Pittsburgh,** demand for heavy steel is moving up decisively after a disappointing December.

Wide plate is out to about eight weeks at **Chicago** area mills. Some buyers are now starting to order 60 days in advance. Strip mill plate is still relatively easy.

Bar — Deliveries are starting to move out, but as yet the trend is not strong. Many **East Coast** and **Pittsburgh** mills are still taking orders for January. It's expected this pattern cannot last much longer. Deliveries are up about a week at **Cleveland.** But buyers are putting in first quarter tonnages.

Stainless—Orders are improving, but the gains are far from spectacular. Prices continue to show further strength. Warehouses in the **West** and **Southwest** are reported reducing the special discounts for sheet.

Tinplate—Mill shipments are due to jump 30 to 50 pct next month. But peak operations are predicted for the first three months of '62.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	5–6 wks	6–8 wks	7–9 wks	6–8 wks	8–10 wks	7 wks
HR Carbon Sheet	4–5 wks	3–5 wks	4–6 wks	4–8 wks	6–8 wks	7 wks
CR Carbon Strip	5–6 wks	4–5 wks	7–9 wks	6–8 wks	8–10 wks	6–7 wks
HR Carbon Strip	4–5 wks	3–4 wks	4–6 wks	4–8 wks	6–8 wks	7 wks
HR Carbon Bars	3–4 wks	3–4 wks	4–5 wks	2–6 wks	4–8 wks	5–6 wks
CF Carbon Bars	2–4 wks	3–4 wks	Stock–4 wks	Stock–6 wks	5–8 wks	2–4 wks
Heavy Plate	3 wks	4–5 wks			8–10 wks	8 wks
Light Plate	2–3 wks	1–2 wks	4–6 wks		4–6 wks	7 wks
Merchant Wire	Stock	Stock	Stock		2–4 wks	Stock
Oil Country Goods	Stock	Stock	Stock		Stock–4 wks	
Linepipe	Stock	1–4 wks	Stock		2–6 wks	Stock–4 wks
Buttweld Pipe	Stock	Stock	Stock	Stock	3–5 wks	Stock–4 wks
Structurals	2–4 wks	1–2 wks	1–4 wks	1–4 wks	4–6 wks	Stock–4 wks
CR Stainless Sheet	Stock–4 wks	1–3 wks	Stock–6 wks	Stock–8 wks		
CR Stainless Strip	Stock–4 wks	3–5 wks	Stock–6 wks	Stock–8 wks		

COMPARISON OF PRICES

(Effective December 22, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Dec. 22 1961	Dec. 18 1961	Nov. 27 1961	Dec. 27 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	49.50	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.49¢	6.49¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Dec. 22 1961	Dec. 18 1961	Nov. 27 1961	Dec. 27 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.11
Foundry, South Cinn.	71.92	71.92	71.92	71.92
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	69.61
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. Cents per lb‡	9.5-11.00	9.5-11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig Iron	$66.44	$66.44	$66.44	$66.32
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$36.50*	$35.50	$33.50	$27.50
No. 1 steel, Phila. area	33.50	33.50	33.50	33.50
No. 1 steel, Chicago	35.50*	34.50	31.50	26.50
No. 1 bundles, Detroit	33.50*	32.50	29.50	23.50
Low phos., Youngstown	37.50	37.50	36.50	29.50
No. 1 mach'y cast., Pittsburgh	44.50	44.50	44.50	44.50
No. 1 mach'y cast., Phila.	47.50	47.50	47.50	47.50
No. 1 mach'y cast., Chicago	46.50	46.50	44.50	42.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$35.17*	$34.50	$32.83	$29.17
No. 2 bundles	24.17	24.17	23.17	19.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper electrolytic, Conn.	$31.00	$31.00	$31.00	$30.00
Copper Lake, Conn.	31.00	31.00	31.00	30.00
Tin, Straits, N. Y.	120.125†	120.875	122.375	101.50
Zinc, East St. Louis	12.00	12.00	11.50	12.50
Lead, St. Louis	10.05	10.05	9.80	11.00
Aluminum, ingot	24.00	24.00	24.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

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PETERSON STEELS, INC.

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Demand Is Growing; Market Stiffens

Optimism is reported by dealers across the country as prices inch forward and they prepare for the expected steel build-up.

Export is beginning to be felt although only slightly.

With an expected first quarter upturn just around the corner, prices of scrap are slowly marching forward. The market continues firm and reports from all over the country note dealer optimism.

The Midwest reports strong prices and a slowly advancing price list. Bullish is a term frequently applied to the situation and heavy buying in Chicago is expected in about a month.

Export is being felt to a small degree in Boston and Philadelphia. And the West Coast markets are poised for a change when Japanese orders are firmed.

With steel demand strengthening, the outlook for scrap is one of rising prices into the first quarter of 1962.

Industrial lists closing this week should be a good indicator of market tone.

Pittsburgh—The market here is still quiet but shows every sign of growing strength. Brokers say it is almost impossible to buy at the old price levels. This condition has produced selective increases of the best grades. The biggest users have not indicated interest in scrap for the near future. Nevertheless, it is felt more money will be needed to maintain even the modest flow of recent months. Industrial lists this week should give a better idea of how big a rise is due. As it stands, the only local consumer is paying $25.00 for No. 2 bundles. There is no new local buying of No. 1 heavy melting but a mill in a nearby district is reported offering dealers as high as $38.00 for this grade.

Chicago—With some bundle suppliers already delinquent on December scrap, the market continued very bullish. Mills resisted the advances strongly, but scrap continued to move at advancing levels. Mild cast iron scrap advances were reported, though the heavy foundry buying season isn't due for another 30 days.

Philadelphia — The market is marking time now. Little new activity is expected until after Jan 1. Better prices are being talked about, but nothing solid is materializing. Japanese exporters closed a pre-Christmas deal at lower prices than were expected. But there is a definite better feeling in the market and mid-January should see the start of a new upturn.

New York—The market here is strong and relatively firm. Much of the feeling of strength is based on expectation of domestic buying. When this comes, prices will probably go up. The price structure is firm now.

Detroit—Each day the market is gaining strength. Anticipation is on the optimistic side with much foundry activity and higher mill operating rates forthcoming. Observers hesitate to attach a dollar value to the mounting strength but it seems to be an across-the-board move on all foundry grades. Only item showing reluctance to gain is stainless. Chrysler Corp. tonnage in January will remain about the same as December, with GM and Ford tonnages up.

Cleveland—Tonnage on area auto lists is up slightly at about 25,000 tons and a modest raise in bids is expected. Some export strength may be felt. Big mills are still moving very cautiously and are not interested in much dealer material yet. Dealers are still bullish and will sell only small tonnages at present prices.

Cincinnati—Price is up $1 on steelmaking grades based on broker offering prices. Additional increase is expected as major area mills enter market for January. Dealers are very bullish over market prospects.

St. Louis—Market showing signs of rising prices. Overall tone in the market is one of strength. Prices are expected to rise $2 to $3 after the first of the year. Dealers continue to hold on to what scrap they have.

Birmingham—Although there has been little buying, the market is very firm and dealers and brokers are bullish. An Atlanta mill purchased No. 2 heavy melting at $34 a ton, an increase of $5 over its last order. This is drawing shipments from the Birmingham area and pulled up the price of this grade.

Buffalo — Some sales in cast grades were made this week at quoted levels. No interest evident in steelmaking grades although dealers hope to see a pickup after the first of the year. Strength in outside markets is keeping prices firm.

Boston—The market is stirring into action. Export is beginning to come back, and the domestic market is improving. One price rise was recorded last week.

Houston — The market is slow. Foundries are out and cast is spotty. An East Texas mill is out until late January. Intake is spotty and export is showing some life.

West Coast—All along the coast, the market remains on dead center. The trade doesn't expect any change until the Japanese export orders are firmed up.

SCRAP PRICES *(Effective December 22, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy melting	28.00 to 29.00
No. 1 dealer bundles	37.00 to 38.00
No. 1 factory bundles	42.00 to 43.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. punch'gs plate	43.00 to 44.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	49.00 to 50.00
RR specialties	47.00 to 48.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	30.00 to 31.00
Stainless	
18-8 bundles and solids	180.00 to 185.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	80.00 to 85.00
410 turnings	50.00 to 55.00

Chicago

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Low phos. forge crops	45.00 to 46.00
Low phos. punch'gs plate, ¼ in. and heavier	45.00 to 46.00
Low phos. 2 ft and under	43.00 to 44.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	44.00 to 45.00
Rerolling rails	57.00 to 59.00
Rails 2 ft and under	50.00 to 51.00
Angles and splice bars	43.00 to 44.00
RR steel car axles	56.00 to 57.00
RR couplers and knuckles	43.00 to 44.00
No 1 machinery cast.	46.00 to 47.00
Cupola cast.	40.00 to 41.00
Cast iron wheels	37.00 to 38.00
Malleable	45.00 to 46.00
Stove plate	34.00 to 35.00
Steel car wheels	43.00 to 44.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	100.00 to 105.00
430 turnings	65.00 to 70.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	11.00 to 13.00
Mixed bor. short turn.	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	27.00 to 28.00
RR specialties	42.00 to 43.00
Rails, 18 in. and under	48.00 to 49.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	38.00 to 39.00
Cast iron car wheels	40.00 to 41.00
Malleable	47.00 to 48.00
No. 1 machinery cast.	47.00 to 48.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.50 to $35.50
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	19.00 to 20.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Low phos. 18 in. and under	41.00 to 42.00
Rails, random length	43.00 to 44.00
Rails, 18 in. and under	49.00 to 50.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	30.00 to 31.00
Drop broken cast.	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	33.00 to 34.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	39.00 to 40.00
Low phos. punch'gs plate	34.00 to 35.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft & under	34.50 to 35.50
No. 1 RR hvy. melting	38.00 to 39.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	50.00 to 51.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	44.00 to 45.00
No. 1 machinery cast.	45.00 to 46.00
Stove plate	37.00 to 38.00
Malleable	48.00 to 49.00
Stainless	
18-8 bundles	160.00 to 165.00
18-8 turnings	95.00 to 100.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 busheling	27.00 to 28.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	33.00 to 34.00
Structural and plate, 2 ft and under	35.00 to 36.00
Rails 2 ft and under	46.00 to 47.00
Scrap rails, random lgth.	36.00 to 37.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
Foundry steel, 2 ft.	29.00 to 30.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	15.50 to 16.50
Shoveling turnings	17.50 to 18.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	35.00 to 36.00
Rails random lengths	40.00 to 41.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	40.00 to 41.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	31.00 to 32.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	53.00 to 54.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	35.00 to 36.00
Bar crops and plate	42.00 to 43.00
Structural and plate, 2 ft	41.00 to 42.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	44.00 to 46.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	40.00 to 41.00
Stove plate	40.00 to 41.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	30.00 to 31.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	15.00 to 16.00
Mixed bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00
Stainless	
18-8 prepared solids	150.00 to 155.00
18-8 turnings	75.00 to 80.00
430 prepared solids	55.00 to 60.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	30.00 to 31.00
Drop forge flashings	29.00 to 30.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	30.00 to 31.00
Mixed cupola cast.	33.00 to 34.00
Automotive cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	75.00 to 80.00
430 bundles and solids	65.00 to 70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	26.00 to 27.00
Machine shop turn.	3.00 to 4.00
Shoveling turnings	9.00 to 9.50
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00

San Francisco

No. 1 hvy. melting		$34.00
No. 2 hvy. melting		27.00
No. 1 dealer bundles		22.00
No. 2 bundles		20.00
Machine shop turn.		12.00
Cast iron borings		12.00
No. 1 cupola cast.	$44.00 to	45.00

Los Angeles

No. 1 hvy. melting	$33.00 to	$34.00
No. 2 hvy. melting	27.00 to	28.00
No. 1 dealer bundles		22.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.		12.00
Shoveling turnings		12.00
Cast iron borings		12.00
Elec. furnace 1 ft and under (foundry)	42.00 to	43.00
No. 1 cupola cast.	42.00 to	43.00

Seattle

No. 1 hvy. melting		$34.00
No. 2 hvy. melting	$27.00 to	28.00
No. 2 bundles	20.00 to	21.00
No. 1 cupola cast.		34.00
Mixed yard cast.		29.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$27.00
No. 2 hvy. melting cut 3 ft and under	21.50
No. 1 dealer bundles	28.00
No. 2 bundles	21.50
Mixed steel scrap	19.00
Bush., new fact., prep'd.	27.00
Bush., new fact., unprep'd.	22.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	30.00
No. 2 bundles	21.00
Machine shop turn.	12.00
Shoveling turnings	15.00
Cut structural plate 2 ft & under	$42.00 to 43.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	28.00 to 29.00

Copper Heads Into Volatile Year

Domestic copper industry is winding up the year with a steady market.

It could be different in 1962, however. Katanga and labor troubles could shake the supply-demand balance.

▪ The domestic copper market is closing out the year in very comfortable fashion.

Producers and smelters have just about accounted for 1961 output. But buyers who want metal can get it at the prevailing market prices.

New Era—However, 1962 will be a year of very different complexion. Few copper men are willing to make specific predictions yet. Most agree that factors are present to make it a very volatile year for copper.

Obvious problem these days is the fighting in Katanga, source of about 8 pct of Free World copper. The situation is still unclear. But since the headquarters and holdings of Union Miniere du Haut Katanga, major producer, have become major military objectives, there is almost certain to be some damage that will delay full production even if the fighting ends.

Trouble Expected—Traders and speculators have looked for trouble. But thus far the disruption in Katanga output hasn't been felt on the market. The company is known to have large stocks in Europe from which it is selling.

Apparently some European buyers aren't so sure these stocks will hold out. There have been no reports of unusual buying in this market by Europeans. But there have been reports of increased interest. Some copper people think this may turn into buying shortly after the first of the year.

Labor Year — Another major question: This is copper's labor year. Contracts between the major producers and many unions expire this summer.

At last count, there were something like 39 unions representing the various employees of copper companies. And any one of these can cause serious trouble. At least one major strike must be considered likely.

A factor that could cause trouble would be a disruption in copper supply lines. Producers' business has been good. They generally have not been able to build up their stocks of unsold metal. Inventories are still less than a month and could disappear quickly in case there is labor trouble or some other disruption.

Against this backdrop of sore spots is the definite upward trend in business. The industry generally did better in 1961 than 1960 in terms of metal sold. And it finished 1961 moving upward, contrasted with the end of 1960 when sales were moving down.

One of the reasons copper people won't predict trouble ahead, but that 1962 will be volatile: There is still a basic over-capacity in the world industry. Many figure that when total demand is matched against supply in 1962, it will fairly well balance.

But disruptions of the balance are very much to be feared.

Brass Mills

"We believe that the brass mill industry will enjoy a volume of business in 1962 not much different than that in 1961," reports C. P. Goss, vice president, Scovill Mfg. Co.

Mr. Goss says the industry hit a peak in May. He concedes the level of business has been generally good this year. And it will be next year, but he sees no boom.

Zinc

After lolling along most of the year at respectable levels, zinc business picked up in the last quarter to make 1961 an outstanding year.

"Consumption of zinc in the U. S. in 1961 is believed to have been the second highest on record," says Simon Strauss, vice president, American Smelting & Refining Co.

"It now appears that deliveries by producers were about 20 pct higher than in 1960."

On 1962, Mr. Strauss says the outlook "appears good." But he adds, "The price of zinc has been strengthening recently . . . further strength in price would not be surprising."

Tin Prices for the Week

Dec. 18—120.875; Dec. 19—120.75; Dec. 20—120.50; Dec. 21—120.375; Dec. 22—120.125*

*Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum ingot	24.00	26.00	9/25/61
Copper (E)	31.00	30.00	5/18/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.05	9.80	11/30/61
Lead, N. Y.	10.25	10.00	11/30/61
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	12.00	11.50	11/30/61
Zinc, N. Y.	12.50	12.00	11/30/61

ALUMINUM: 99% ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 77.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	47.4	46.4	45.4	44.4
5052	54.8	52.0	49.8	46.8
6061-0	53.0	50.3	48.4	47.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 3/8
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Munts Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb, f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.00-$15.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $3.60-$4.00; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb)... $1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95¢ to 36.95¢
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz. .... $70 to $75
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $190 to $192
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz.... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 104.75
Thorium, per kg $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
- 0.30 copper max. 22.75-23.25
- 0.60 copper max. 22.50-23.00

Piston alloys (No. 132 type)... 24.50-25.50
No. 12 alum. (No. 2 grade)... 20.75-21.25
108 alloy 21.25-21.75
195 alloy 23.75-24.25
13 alloy (0.60 copper max.)... 22.50-23.00
AXS-679 (1 pct zinc) 21.00-22.00

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 22.75-23.75
- Grade 2—92-95% 21.50-22.50
- Grade 3—90-92% 20.50-21.50
- Grade 4—85-90% 19.50-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	
Yellow brass	20⅝	18⅛
Red brass	23⅞	23⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	
Free cutting rod ends		18½

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27
- No. 2 copper wire 25
- Light copper 23¾
- *Refining brass 23¾
- Copper bearing material 23¾

* Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27
- No. 2 copper wire 25
- Light copper 23¾
- No. 1 composition 24¼
- No. 1 comp. turnings 23¾
- Hvy. yellow brass solids 17½
- Heavy yellow brass turnings. 16½
- Radiators 20¼

Aluminum

- Mixed old cast. ..... 11½—12
- Mixed new clips ..... 13½—14
- Mixed turnings, dry ..... 12½—13

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 23½—24
- No. 2 copper wire ..... 21½—22
- Light copper ..... 19¼—19¾
- Auto radiators (unsweated) . 16 —16½
- No. 1 composition ..... 20 —20½
- No. 1 composition turnings.. 19½—20
- Cocks and faucets ..... 16½—17
- Clean heavy yellow brass ... 14¼—14½
- Brass pipe ..... 16¼—16¾
- New soft brass clippings .... 17¾—18¼
- No. 1 brass rod turnings .... 15½—16

Aluminum

- Alum. pistons and struts .... 6½— 7
- Aluminum crankcase ..... 9 — 9½
- 1100 (2s) aluminum clippings 11¼—11¾
- Old sheet and utensils ..... 9 — 9½
- Borings and turnings ..... 4¼— 4¾
- Industrial castings ..... 8¾— 9¼
- 2020 (24s) clippings ..... 10 —10½

Zinc

- New zinc clippings ..... 5 — 5¼
- Old zinc ..... 3 — 3¼
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1¾— 2

Nickel and Monel

- Pure nickel clippings ..... 56 —58
- Clean nickel turnings 43
- Nickel anodes ..... 60 —62
- Nickel rod ends ..... 56 —58
- New Monel clippings 32
- Clean Monel turnings ..... 22 —24
- Old sheet Monel 30
- Nickel silver clippings, mixed..... 20
- Nickel silver turnings, mixed. 16

Lead

- Soft scrap lead ..... 6¼— 6½
- Battery plates (dry) ..... 2 — 2¼
- Batteries, acid free ..... 1¼— 1½

Miscellaneous

- Block tin ..... 90 —92
- No. 1 pewter ..... 64 —66
- Auto babbitt ..... 45 —46
- Mixed common babbitt ..... 9½—10
- Solder joints ..... 13¾—14¼
- Small foundry type ..... 8 —8½
- Monotype ..... 8¼— 8¾
- Lino. and stereotype ..... 7⅛— 7⅝
- Electrotype ..... 7 — 7¼
- Hand picked type shells .... 5¼— 5⅝
- Lino. and stereo. dross ..... 1 — 1½
- Electro dross ..... 1⅝— 2¼

(Effective Dec. 22, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi.Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*		5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*		5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*								
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1, T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*			5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*			5.85 *C7, J2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*			6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*					
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras

(Effective Dec. 22, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Coke* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. tarne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. *COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*						9.325			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3, Y1.*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *Y1, I3*	9.275 *Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	$6.65 *C2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *J3*	9.275 *J3* 10.125 *J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢. †† 7.425 at Sharon; Niles is 7.225.

(Effective Dec. 22, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*		7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*		8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*		8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Medina, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, W13, B5*		9.025 *A5, C13,W13*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,W13*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*		
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.25 *C16*				5.30 *T2,R3*				8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Dec. 22, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
W13 Western Cold Drawn Steel, Div. of Standard Screw Co., Elyria, O.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.36	10.16	11.35	9.70	9.95	9.75	11.80	17.48	16.48	21.58	20.83
Birmingham		9.11	11.00	11.39	10.10	9.06	9.12	8.91	13.14	18.84	16.65	22 94	22 19
Boston**	.10	10.00	10.50	11.87	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	8.20	8.31	8.08	13.10	17.50	16.35	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.63	12.85	18 59	16 68	22 69	21 04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.49
New York**	.10	9.91	10.44	11.64	13.67	9.99	10.45	10.15	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.99	11.55	9.70	10.10	9.95	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.65	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.65	22.15
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.63
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64	.....	16.69	21 79	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 1.3c zinc. 2 Deduct for country delivery. 3 15 ga. & heavier; 9 14 ga. & lighter. 9 10 ga. x 48 — 120.

(Effective Dec. 22, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75c per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — *Pct*

Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — *Pct*

Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	42	42
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	46
5/16, ⅜ & ½ in. diam	15,000 pcs	46

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	42	54
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	52	57
	15,000 pcs	
	52	57

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	11

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mills

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Dec. 22, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	42.25	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown. *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1:* Claymont, Del: *P2.*

Forging billets: Ambridge Pa., *B7;* Midland Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Chicago *W7*	173	...	...	...	...	9.00	9.55†
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.86
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2'*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
SparrowsPt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc at .12¢ a lb. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD ½ In. Blk.	½ In. Gal.	¾ In. Blk.	¾ In. Gal.	1 In. Blk.	1 In. Gal.	1¼ In. Blk.	1¼ In. Gal.	1½ In. Blk.	1½ In. Gal.	2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	SEAMLESS 2 In. Blk.	2 In. Gal.	2½ In. Blk.	2½ In. Gal.	3 In. Blk.	3 In. Gal.	3½-4 In. Blk.	3½-4 In. Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12¢ per lb.

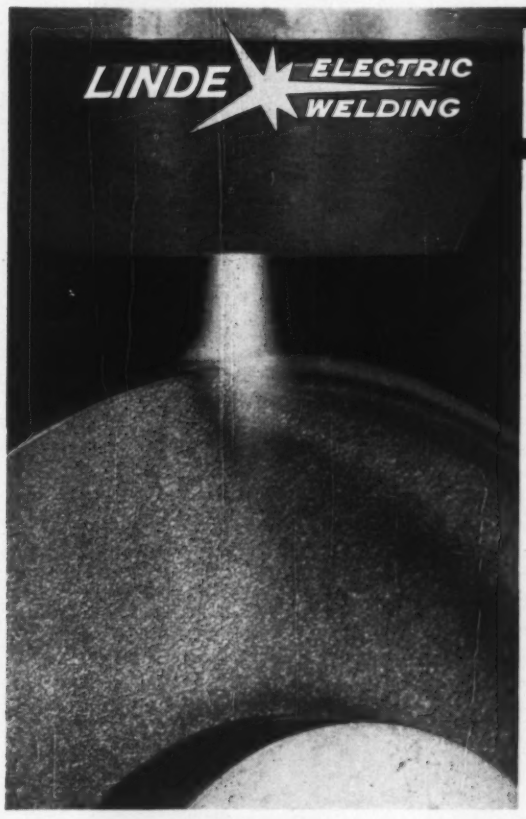
CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.70
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75



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From LINDE, the inventor of plasma arc processes, comes PLASMARC weld surfacing – the first process for depositing very-thin fused overlays of heat-, wear- and corrosion-resistant materials, with controlled dilution, at high speeds. PLASMARC weld surfacing utilizes the intense heat (30,000° F.) of a constricted plasma arc created within its torch and transferred to the work. The metal is fed into the torch as a powder. It is carried to the work in the plasma jet formed from argon gas. *Check these features:*

- Penetration into base precisely controlled to .005-in. and up.
- Dilution with base precisely controlled to 5% up to 50%.
- Deposits as thin as .010-in., as thick as 3/16-in., in one pass.
- Deposits as narrow as 1/8-in., as wide as 1 in. or more.
- Speeds over 20 ipm at 95% deposition efficiency.
- Flatter, smoother deposits than other fusion processes.
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Division of Union Carbide Corporation
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UNION CARBIDE

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25			
Cleveland *R3*						15.35
So. Chicago *R3*				10.10		
Ensley *T2*	5.75	6.725				
Fairfield *T2*		6.725		10.10	6.875	
Gary *U1*	5.75				6.875	
Huntington, *C16*		6.725				
Ind. Harbor *I3*				10.10		
Johnstown *B3*		6.725				
Joliet *U1*			7.25			
Kansas City *S2*				10.10		15.35
Lackawanna *B3*	5.75	6.725	7.25		6.875	
Lebanon *B3*			7.25			15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*						15.35
Pittsburgh *J3*				10.10		
Seattle *B2*					7.025	15.85
Steelton *B3*	5.75		7.25		6.875	
Struthers *Y1*				10.10		
Torrance *C7*					6.75	
Williamsport *S5*		6.725				
Youngstown *R3*				10.10		

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Anderson, Ind. *G4*	9.10				
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 44.50
Electrodeposited, 5000 lb lots 37.50
OFHC anodes, 3 in. diam. (5000 lb) 42.50
Brass, 80-20, ball anodes, 2000 lb or more 51.50
Zinc, ball anodes, 2000 lb lots 18.25
(for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb 1.05
(Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.60
Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90
Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45
Nickel sulfate, 5000 lbs 31.00
Nickel chloride, freight allowed, 100 lb 47.50
Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums.... 25.80
Zinc cyanide, 100 lb, N. Y. 61.50
Potassium cyanide, 100 lb drum Chicago, del'd east of Rockies... 46.50
Chromic acid, flake type, 10,000 lb or more, N. Y. 30.94

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75
Carbonyl Iron (200 lb lots) 88.00
Welding Grades 8.10
Cutting and Scarfing Grades 9.85
Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades
Electrolytic, domestic, f.o.b. shipping point. 15.00†
Atomized ..... 44.3 to 62.3
Reduced ..... 15.00†
Chemically Precipitated 45.5
Brass, 5000-lb lots ..... 35.2 to 44.2
Bronze, 5000-lb lots ..... 51.6 to 57.0
Chromium, electrolytic 5.00
Lead ..... 7.50†
Manganese, electrolytic ... $1.00
Molybdenum ..... $3.60 to $4.35
Nickel $1.15
Carbonyl Nickel, 20,000 lb lots $1.01
Nickel-Silver, 5000 lb lots.. 56.1 to 68.1
Silicon 70.00
Solder ..... 7.00†
Stainless Steel, 316 ..... $1.07
Stainless steel 304 ..... 89.00
Tin ..... 15.00†
Titanium, 99.25 + pct, per lb, f.o.b. $11.25
Tungsten, carbide grades... $3.25
Zinc ..... 20.0 to 28.0

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.875	
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type 302				37.50
304	28.80	31.55	34.30	39.75
316	42.20	46.25	50.25	58.25
321	34.50	37.75	41.05	47.25
347	40.80	44.65	48.55	57.00
405	24.60	26.90	29.25	
410	22.70	24.85	27.00	
430	23.45	25.65	27.90	

CR Strip (S9) Copper, 10 pct, 2 sides, $43.85 [illegible]

(Effective Dec. 22, 1961)

REFRACTORIES

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Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
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Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays 163.00
Chicago District 168.00
Western Utah 183.00
California 185.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O. 163.00-168.00
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union, Pa. 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md. $620.00
Gary, Ind. 658.50
Standard, Pascagoula, Miss. 647.50
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Baltimore 585.00

Magnesite Brick

Standard, Baltimore $715.00
Chemically bonded, Baltimore 655.00
Chemically bonded, Pascagoula, Miss. 682.50

Grain Magnesite

St. ⅜ to ½-in. grains

Per net ton

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In bulk 46.00
In sacks 52.00-54.00

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Missouri Valley 15.60
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GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
Ohio Seamless Tube	3	12	62.62	73.40	55.59
Div., Copperweld	3½	11	73.11	85.70	65.84
Steel Co.*	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	
	2½	12	54.23	63.57	
	3	12	62.62	73.40	
	3½	11	73.11	85.70	
	4	10	97.08	113.80	

* Electricweld only.

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Midwestern Sales Up, Dealers Optimistic

Rising sales rate is often a healthy 20 pct. Many dealers are feeling a surge of demand from small shops.

The first quarter of 1962 should be good and might carry the sales rate higher.

▪ Midwestern dealers report that the gains of the past two months have continued into December and that even the usual holiday lull is somewhat offset by a breakout of orders coming from smaller shops.

Optimism, on the gain six weeks ago, has heightened sharply in the past 30 days. Sales climbs of 20 pct in the current month are reported with fair frequency. Another factor that's boosting morale sharply is the amount of first quarter business now being either discussed or actively booked.

Trend Seen—A number of buyers, and this includes both large and small companies, have specified tools for delivery after January 1. Some of this was reported in this area as early as a month-and-a-half ago, but the trend seems to be accelerating and is becoming much more widespread.

No great change in order activity from the West Coast is reported, but material is moving to Eastern buyers at a good clip, and a faster rate of incoming orders from both the South and Southwest are now apparent.

Dealers still complain that auctions are generating a lot of tool user competition, but agree that prices in this area are very firm and, if anything, on the upswing.

Small Shops—An important buying area to many distributors, the small machine shops which buy quantities of tool room or general purpose equipment, became active a month ago and this is still gaining. As reported in this column earlier, they were doing some buying as early as September. The pace quickened in November. It's still gaining steam as December draws to a close. If there's a rub, it's in some pretty close bargaining on price by the small buyer. But he is buying, in considerable volume, and at a gaining pace.

The out-of-area orders that touched off the original gains in the Midwest continue, but have been reinforced by some heavy equipment purchases by local buyers.

Big Picture—With all these areas beginning to move up, the entire machine tool picture is strong enough that some shops are able to predict strong first quarter gains on the basis of orders already booked or strong inquiry rates. It's still, they say, a little early to be sure about second quarter activity, but there is every reason to expect a second quarter that will at least equal first quarter levels.

Fabricating equipment has remained strong locally for a considerable period. Even this picture, however, has gained a little more velocity with a recent crop of out-of-area orders for fabricating equipment. Orders mentioned include material going to the East, South, and some equipment that moved into the Detroit area.

Heavy Machinery—Heavy milling, drilling, planing equipment and production lathes have stepped up volume. At least one source reports a surprisingly strong run on small lathes, as well.

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